



FRIDAY, OCTOBER 26, 1894.

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Contributions.

The International Railway Congress.

29 Abingdon St.,
WESTMINSTER, S. W., Oct. 8, 1894.

TO THE EDITOR OF THE RAILROAD GAZETTE:

May I be allowed to say one word in reference to a statement in your issue of Sept. 28, which, though not incorrect, will, I think be likely to lead to misunderstanding? You say that the action of the Executive of the International Railway Congress in accepting the American Railway Association as a member, "practically admits all the American railroad companies, now members of the Association, to membership in the Congress without further trouble or fees." This is only true to a very limited extent. For according to the constitution of the Congress on single railway administration—and it is as a railway administration that the American Railway Association has been classed—can send more than eight delegates. If any American railroad company wishes, therefore, to send more than a fraction of a delegate it must join the Congress direct and so obtain representation in its own right.

I am glad to say I have already heard that more than one of your great companies propose to send over a batch of their leading officers to represent them; and certainly we, on this side of the water, shall be much disappointed if we do not have the opportunity of welcoming many times eight representatives of American railroads in London next June. W. M. ACWORTH.

Secretary of the English Section.

Long Valve Travel and the Locomotive "J. W. Miller."

PROVIDENCE, R. I., Sept. 1, 1894.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of August 17, I noted with much interest what you had to say about long valve travels in locomotives and their performance. That part that refers to the N. Y., P. & B. Engine, "J. W. Miller," particularly interested me, and I wish to correct some of the statements you make, in order that a correct understanding may be had. Allow me to first give you a brief history of this engine and its inception.

In the fall of 1886, the management of the N. Y., P. & B. R. R. Co., desired an anthracite coal burning locomotive built for fast express service. Accordingly a specification was prepared and contract made with R. I. Locomotive Works for above named type of engine. The construction and general design were just about the same as those in use on the Lehigh Valley Railroad, Wyoming Division. The General Manager required a guarantee of a performance by the builders of 60 miles per hour, with Shore Line trains of 8 cars, which was agreed to. The engine was built according to specifications, except rigid wheel base, this was made 6 in. shorter. Valve motion was not specified. Delivery was made in January, 1887. The following is a description as she came from the builders, followed by the alterations afterwards made and why made by the railroad company: Cylinders, 18 in. x24 in.; rigid wheel base, 7 ft. 0 in.; diameter of drivers, 6 ft. 0 in.; eccentric throw, 6 1/2 in.; valve travel, 7 1/2 in.; steam ports, 2 in. x18 in.; exhaust port, 4 in. x18 in.; valves, Richardson balanced, Allen patent, inside lap, none, inside lead, none; outside lap, 2 in.; weight of valves, 220 lbs each; boiler ordinary wagon top style, 54 in. diameter of shell; 218 flues, 2 in. outside diameter, 10 ft. 5 in. long; firebox, 126 in. x43 in.; tubular grates; position of firebox, top of the frame; steam pressure, 180 lbs. per sq. in.; fuel, anthracite coal; total weight ready for train 117,500 lbs.; weight on drivers, 83,400 lbs.

The builders put in valve motion that in their judgment would best do the required and guaranteed work. Upon

completion and delivery her weight was objected to, particularly so on account of the short wheel base, resulting in the addition of a pair of trailing wheels, distributing the weight on about 12 ft. 0 in. of wheel base, instead of 7 ft. The reason for this was that at that time the railroad company was renewing its bridges everywhere and removing old light weight rails. For obvious reasons she was not run regularly for about 18 months. During this time it was found that the excessive weight of valve and long lap were not practical for two reasons: First, no man could handle the lever at high speed whether she was using steam or not. Second, if she stopped in a certain position there was not sufficient opening to start the train. To move her back to change position for a start was annoying and caused a loss of time, and something had to be done to put her in condition for service required (not to satisfy the notions of that local Master Mechanic referred to). I proceeded to change the parts that were clearly at fault.

This change was as follows: I put in false valve seats 1 1/2 in. thick, and reduced the ports to 1 1/2 in. x16 in., exhaust port, 4 in. x16 in., made new valves 1 in. outside lap, line and line inside, Richardson balance 4 square inches less than port areas; changed the travel to 6 1/2 in. New valves weighed 104 lbs. each. The engine then handled easily at any speed, made plenty of steam and the schedule time and better if necessary on any of the Shore Line trains. In the summer of 1888, she was put into regular service on the 10 a.m. train on Shore Line, Boston to New York. She ran this train until the consolidation with the N. Y., N. H. & H. R. R., July 1, 1892, when engines commenced running to New Haven. She ran there a few times, but had to discontinue running her then because she would not go through the engine house on to the table in New Haven; their other table was not accessible at times. She had now completed a mileage of about 50,000, and needed rebuilding, new tires, etc., and had a broken frame. It was decided to take her out of service for that purpose. She was again ready for service in May, 1894. The trailing wheels had been removed and rigid wheel base changed from 84 in. to 102 in.

Engines were now running between Boston and New London (O. C. system). There did not now appear to be any train that I could put her on, except a local run between Providence and Stonington, which was not a suitable train for her. About this time it was discovered that hard coal burning engines were a failure on the O. C. system and the Miller was ordered to South Boston shops for a new boiler with deep fire box, 34 in. x78 in. for soft coal burning, thus precluding the possibility of any more hard coal fuel for the engine Miller. She is still in the shop.

You can easily determine from what I have written whether this engine is a mongrel or not. If she is then the hard coal boiler made her so, and every other eight-wheel American type of engine must be rated as mongrels.

The Miller has never run in freight service, but has been run in passenger service and has got an A No. 1 record. I have it complete for every day's performance that she has ever done, viz.: Miles run, cars hauled, fuel consumed, cause of all delays, time of departure and arrival at terminals, etc., all of which I should be glad to show you or any one who will call and desire to see them. Your report of failure for this engine is not a fact, as I have shown. It is apparent to me where your impressions came from, and why your informer knew better than to say such things and knows that such stories are not fair. The old management of N. Y., P. & B. R. R. will endorse all I have written. I believe in all the improvements that can be made, and have worked just as hard as anybody to that end without making very much noise about it either. In this case I did not innovate on the long valve travel or do it to in anyway criticise the builders. I simply made the changes necessary to get a good working engine and I succeeded, and in all that has been written about this engine no one to my knowledge has made any effort to ascertain facts, consequently misrepresentation ruled and was in many cases accepted as fact. This it would seem suited a good many best. I must add that I doubt that anybody ever before or since has put such conditions of valve and travel into a locomotive. If they did, I can't see how high speed could have been maintained without disaster.

L. M. BUTLER.

Sept. 12, 1894.

Those other questions you ask I will try to answer. To what I said about the Miller not being able to start her train if stopped in certain positions, the valves were not open enough to admit sufficient steam. I do not know what the intentions of the builders were about reducing lap if found necessary. I am somewhat familiar with some of the large valves you mention, but do not know of any with such excessive weight as the Miller had. Please note, my letter says no man could handle the lever at high speed whether the engine was using steam or not. I am at a loss to understand where you got your information on this point; it could not have come from anybody who knew about it, and I know no one could have known better than myself and the men who ran her. I must maintain she was not a failure and have the records to back it up. She never was run on the guaranteed time and service, because there never has been a train scheduled on this road requiring such performance or anywhere near it. This guarantee was for 62 1/2 miles in 62 1/2 minutes, with one stop between Groton Ferry and Providence. She has made some very good runs, how-

ever, with heavy trains in times when late. She was run and well broken in and on different trains before alterations were made, and entered into regular service. She hauled 13 car loads of G. A. R. men from New London to Providence (cars were loaded full) in about 66 minutes, as near as I can recollect. A few other very satisfactory runs as extra and aside from regular time can be found.

L. M. BUTLER.

[Some notes on this subject will be found on the editorial pages.—EDITOR.]

The Elevated Railroads of Chicago.

There has been for several years past a lively interest in the subject of elevated railroads in Chicago. It long ago became apparent that the street railroad system of the city was each year becoming less capable of properly handling the traffic which naturally fell to it, and as the traffic increased, the delays and interruptions became more frequent. This state of affairs naturally led to the incorporation of a number of companies with various schemes for rapid transit. With but few exceptions these contemplated the construction and operation of elevated roads. Out of a dozen or more of such schemes, four show some prospect of materialization: the Chicago & South Side Rapid Transit Railroad Company, the Lake Street Elevated Railroad Company, the Metropolitan West Side Elevated Railroad Company and the Northwestern Elevated Railroad Company.

The two roads first named have now been in operation for some time, although on account of a lack of branch lines and terminal facilities, their success has not been very encouraging. The Metropolitan is under construction and it is expected that by the end of the year it will have about 10 miles in operation, of which nearly two miles is four-track road, the remainder being double track. Construction on the Northwestern has not yet been begun, for reasons that will appear later.

The line of the Chicago & South Side Rapid Transit Railroad Company, or the "Alley Elevated," as it is generally called, was the first to be operated in Chicago, and is well-known to many of the readers of the *Railroad Gazette* as the road between the city and Jackson Park. The first franchise for this road was got March 26, 1888, and permitted the construction of an elevated railroad from a point on Van Buren street, between Dearborn street and Wabash avenue, south to a point between Thirty-seventh and Thirty-ninth streets, from which point it was to be extended in an easterly or south-easterly direction, reaching Thirty-ninth street, then the city limits, at some point between Dearborn street and Forest avenue. A large block of territory [south of Thirty-ninth street having been annexed by the city of Chicago, subsequent to the passage of this ordinance, it was amended April 2, 1891, the company obtaining permission to extend its line, from a point on the main line between Thirty-seventh and Thirty-ninth streets, south to a point between Forty-first and Forty-third streets, east to a point between Grand Boulevard and Michigan Boulevard, and south again to a point between Sixtieth and Sixty-third streets. From this point the road was to be extended in an easterly direction to Jackson Park. This ordinance provided also for two branches: one from a point between Fifty-fifth and Fifty-ninth streets west to Englewood and south to a point on Sixty-third street between Wallace street and Wentworth avenue; the other branch extending south to Seventy-first street from a point on the Jackson Park extension, and lying between South Park avenue and Cottage Grove avenue. An ordinance passed March 21, 1892, authorized the company to build a structure from the alley between Prairie and Calumet avenues, east on Sixty-third street to Jackson Park, the railroad company having got the required consent from the holders of property along the line.

The route from the city to the point above named on Sixty-third street had then been obtained by purchase or condemnation and several miles of the structure erected. The company was unable to reach Van Buren street at a reasonable cost on the line selected, and made Congress street their northern terminus. From this street south the line was located between State street and Wabash avenue, occupying the alley for a part of the distance, and for the remaining part acquiring property along or near the alley as far as Forty-third street. From this point the route lay along the south side of Forty-third street as far east as the alley between Prairie and Calumet avenues, where it turned south to Sixty-third street.

The structure and stations from Congress to Forty-third street were completed early in 1892, and May 27, 1892, the road was opened to Thirty-ninth street, a distance of about 3 1/2 miles from the northern terminus. The service was extended beyond Thirty-ninth street as the construction advanced, and within a year had reached Jackson Park, a distance of about 8 1/2 miles from the down town terminus.

The design of the structure of this road has been illustrated in the *Railroad Gazette* of April 4 and 11, 1890, and Sept. 1, 1893. The cars were illustrated and described on June 17, 1892, and the locomotives on April 15 and October 28, 1892.

Neither of the extensions authorized by the ordinance of April 2, 1891, has yet been built, though efforts have been made to induce the company to build the Englewood branch. This would increase the traffic of the road, and as it calls for the construction of only about a mile and a half of line, it would doubtless be built were it not for the probable high cost of the right of way.

The south branch to Seventy-first street would pass through a thinly settled district; though if built near Cottage Grove avenue it would be in a position to compete with the Cottage Grove avenue line of the Chicago City Railway for passengers transferring at this point from the Calumet Electric Railway. A branch from the main line at Thirty-ninth or Fortieth streets to the Stock Yards has also been talked of, though the idea now appears to have been given up. The extension of which the line stands in greatest need, is one which will make it easier of access from the northern and western parts of the business district. With both the State street and Cottage Grove avenue lines of the Chicago City Railway reaching more than half a mile farther to the north of the Congress street terminal of the elevated road, it can hardly be expected to get its full share of the traffic. So long, however, as the road is controlled by heavy stockholders in the Chicago City Railway Company, it seems hardly probable that any of these extensions will be built. The road is now earning somewhat more than its operating expenses, although the surplus lacks considerable of being enough to meet all obligations. The minority stockholders are making a strong effort to get the road out of the control of those connected with the Chicago City Railway Company and to secure a down-town loop, or an extension of the present line to such a point as will enable the company to get a reasonable share of business.

The second elevated road, and at present the only other one in operation in Chicago, is the Lake Street Elevated Railroad. This company now has about $6\frac{1}{2}$ miles of road constructed and in operation, the western terminus being at West Fifty-second street, the line extending eastward on Lake street across the river to Market street and south to Madison street.

The first franchise granted was to the Lake Street Elevated Railway Company. This was passed December 28, 1888, and permitted the company to build from Canal street west to the city limits. This ordinance was amended November 24, 1890, by two ordinances, one of which permitted the company to build on Lake street from Canal street to Crawford avenue; the other, to extend the line west to the city limits from Crawford avenue and east to Market street from Canal street. These ordinances gave the company the privilege of crossing on the viaduct and the drawbridge over the river, the railroad company to make such changes as would make these structures safe. The construction of the road progressed slowly, partly on account of litigation and partly for financial reasons. On November 30, 1891, the City Council passed an ordinance authorizing the return to the company of the deposit of \$100,000, required by the terms of the ordinance of November 24, 1890, and requiring the company to file in its place a bond for \$200,000, guaranteeing the performance of the conditions imposed.

August 30, 1892, the name of the corporation was changed by the substitution of the word "railroad" for "railway," and the City Council, at a meeting held December 19 of the same year confirmed the change. May 15, 1893, an ordinance was passed giving the company permission to build a number of branches, one of them beginning at the corner of Market and Lake streets and extending southward on Market to Madison street. This branch has been built as an extension of the line authorized by the ordinances of November 24, 1890, and all trains run to the Madison street terminus. Of the other branches authorized, one was to leave the main line at a point between La Salle and Jefferson streets, and run northerly or northeasterly to Fullerton avenue at a point between Sheffield and Larrabee streets, and from thence in a northerly or northeasterly direction to the city limits. Another was to begin at a point on the main line within 750 feet east or west from Halstead street and run south to the city limits. Of the two other branch lines projected, one was to begin at a point on the main line between Rockwell street and California avenue, run north to Diversey and from there in a northwesterly direction to the city limits; while the other was a short line extending south from the main line to Madison street between Hamlin avenue and West Forty-first street.

Still another ordinance passed by the City Council on

road Gazette, of March 7, 1890. The locomotives used by the company were built by the Rhode Island Locomotive Works and were illustrated in the Railroad Gazette of August 4 and 11, 1893.

south branch to the west, running to a point not more than 1,000 feet west of Halstead street, from which point it was to branch both in a northwesterly and a southwesterly direction. Another branch was to leave the



Sketch Map of Chicago Elevated Railroads.

An ordinance was passed January 8, 1894, by the City Council, giving to the Northwestern Elevated Railroad Company permission to construct an elevated line from a point on or north of Monroe street, and between Wabash

main line at a point between North avenue and Chicago avenue, and run west to a point between Western avenue and Ashland avenue, from whence it was to extend north. A third branch was to leave the main line at a point between Diversey avenue and North avenue and extend in a northerly direction to the city limits, while the fourth branch was to leave the main line between North avenue and Belmont avenue and run west to the city limits.

Electricity was to be used as the motive power on the lines of this company. The preliminary work on the main line was conducted with such a show of vigor that the management of the North Chicago Street Railroad and the West Chicago Street Railroad Companies, apparently thinking it better to control the new company than to fight it, acquired a large interest in it. In order to protect their north and west side interests, provide down-town terminals for the Northwestern Elevated lines and gain control of the franchise of the Lake Street Elevated Railroad Company, which practically covers the same territory as that of the Northwestern Elevated Company, a syndicate representing the management of the surface lines above referred to recently bought enough of the stock of the Lake Street Elevated Railroad Company to give them control of it. The two elevated companies are thus practically consolidated, so far as management is concerned, with the street railroad companies of the north and west sides.

It is not an easy matter to find out from the management of the combination what it is proposed to do in the way of building over the lines covered by the ordinances granted to the elevated railroad companies. So far as

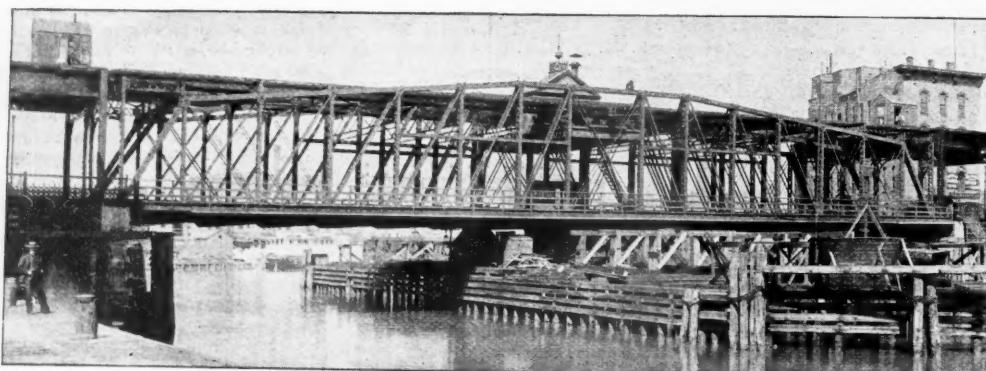


Fig. 1.—Tracks of the Lake Street Elevated Railroad Company on Lake Street Bridge.

October 1, 1894, gave this company permission to extend their line east on Lake street from Market street to Wabash avenue.

The design of the greater part of the structure which this company has thus far erected is shown in the Rail-

avenue and Market street, north to the river at a point between Cass street and the north branch of the river, and north or northwest to the city limits. One branch named in the ordinance was to leave the main line at a point between Monroe street and the river and cross th

can be learned, however, it is the intention to push the construction of the extension of the Lake Street Road to Wabash avenue, and follow this with a branch to the north under the ordinance granted to one of the two companies, and a branch on the main line to the north and west under the ordinance granted to the Lake Street Elevated Railroad Company. This company filed last spring with the Commissioner of Public Works the route over which it was proposed to build these branches. The Northwestern Elevated Company has filed its proposed route only so far north as North avenue. Their franchise requires that the routes over which they propose to build

to the northeast and a line 1,000 feet to the southwest to a point near the city limits, and one from a point on the Milwaukee avenue branch between North avenue and Bloomingdale road west to the city limits.

The construction of this road has been energetically pushed ever since the franchise was granted. At present the main line is constructed, rails laid and stations practically finished, from Jefferson street west to Forty-eighth street, a distance of $5\frac{1}{2}$ miles. From Jefferson street west to Paulina street, the road is a four-track structure, and from Paulina street west a two-track structure. East of Jefferson street the work has been delayed by litiga-

tion as soon as the motive power equipment is on hand and in working order. The work of construction has not yet been commenced on the branch west of North avenue.

It will be observed that this line crosses the Lake Street Elevated Road a short distance west of Paulina street. Fig. 3 shows the crossing of the two roads at this point, the structure of the Metropolitan road clearing the rails of the Lake Street Road by about 14 feet. The columns supporting the structures of this portion of the Metropolitan Road are all of a standard length for level track and are placed upon masonry piers of suffi-

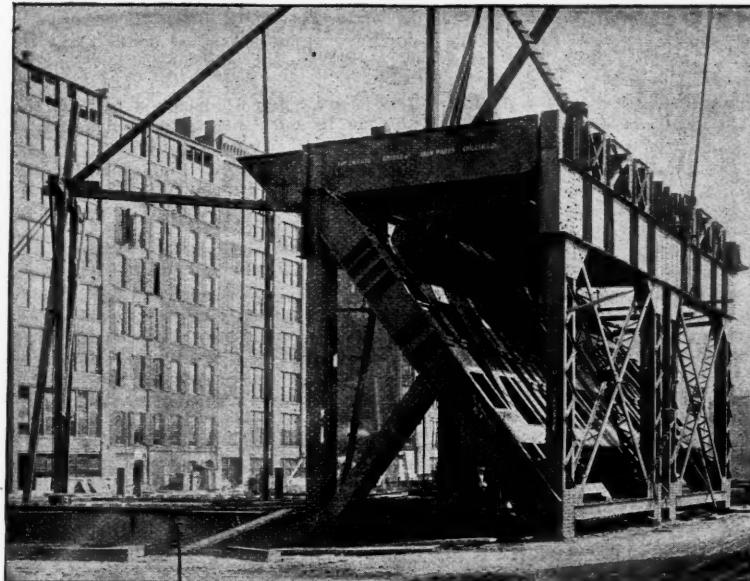


Fig. 2.—West Pier, Four Track Bridge, West Side Metropolitan Elevated, Short Span adjoining.

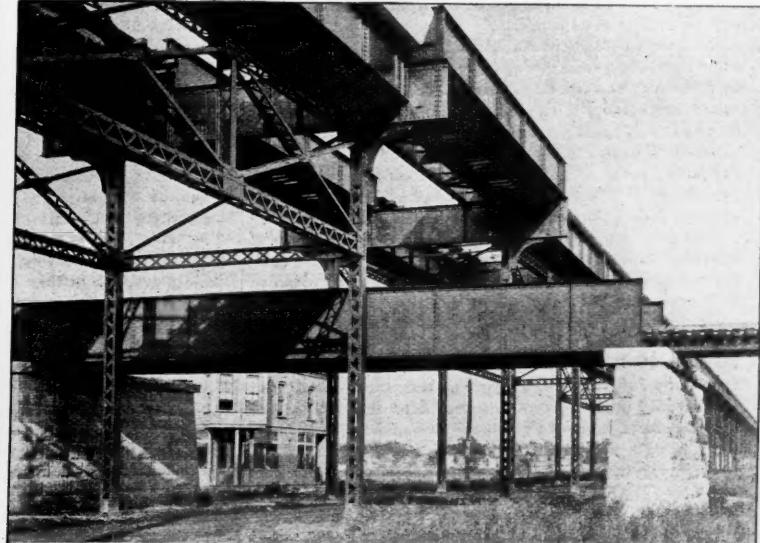


Fig. 4.—Crossing of Lake Street Elevated Railroad and Belt Railway of Chicago on West Lake Street.

shall be filed within a year of the acceptance of the ordinance, or by the first of next February.

From the map accompanying this article it will be seen that the proposed line of the Northwestern Elevated Company turns north at a point almost directly south of the proposed line of the Lake Street Elevated Road, and a short distance east of Halstead street. So far as known, no steps have been taken to acquire the necessary right of way along the line laid out by the Lake Street Company. The Northwestern Elevated Company, however, is said to be quietly buying property along the proposed right of way.

With the exception of one short line of electric road, the Metropolitan West Side Elevated Railroad Company

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With the exception of one short line of electric road, the Metropolitan West Side Elevated Railroad Company

tion over property between that street and Canal street. From the east line of Canal street to the west bank of the Chicago River, a viaduct of two spans will carry the four tracks of this road. The viaduct is now under construction and will soon be completed. The bridge over the river will be of the bascule type, as shown in the *Railroad Gazette*, of October 20, 1893. The construction of the west bridge pier is now practically completed, and work will soon begin on the east pier. Fig. 2, gives an idea of the appearance of the west pier and the short span adjoining. The buildings on the right of way east of the river are being rapidly removed to make way for the structure, which it is proposed to erect as soon as the bridge is completed. It is expected that the litigation

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height to lift the structure to the required point. The elevation of the line begins shortly after leaving the main line of the road and reaches a maximum at the crossing. The columns next to the street are not supported by masonry piers, but by the construction shown in our illustration.

Fig. 4 shows a crossing of similar character of the Lake Street Elevated structure over that of the Belt Railway near West street. It will be observed from Figs. 3 and 4 that the structure of the Lake Street Elevated Road differs materially from that of the Metropolitan, and from that of the Chicago & South Side Rapid Transit Railroad Company, as shown in the *Railroad Gazette*, of April 4 and 11, 1890. This is partly due to the fact

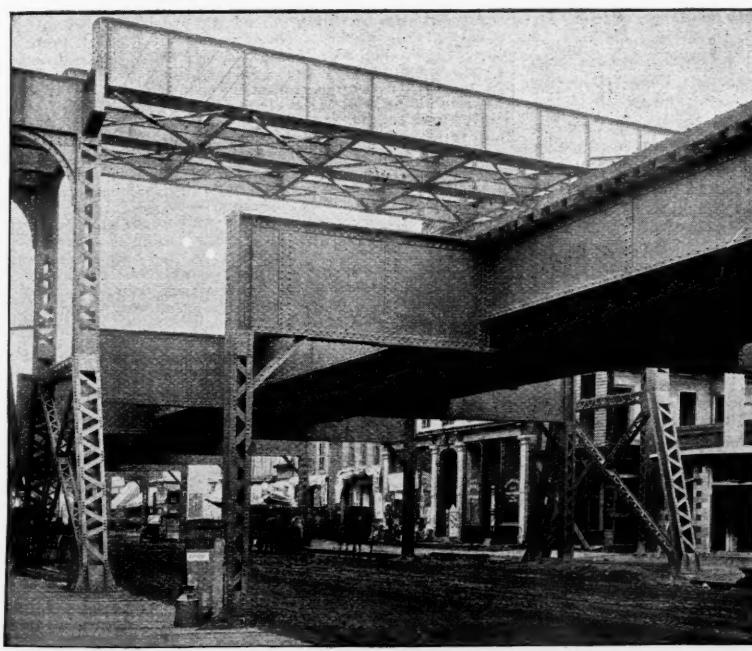


Fig. 3.—Crossing of Milwaukee Avenue branch of West Side Metropolitan Elevated over the Lake Street Elevated on Lake Street.

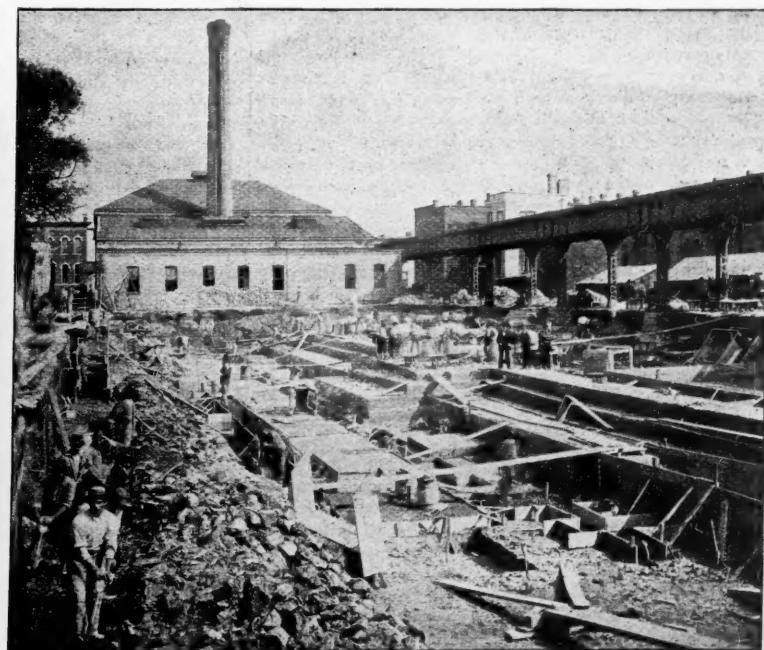


Fig. 5.—Foundations of Power House, West Side Metropolitan Elevated.

will offer practically the only competition to the above mentioned combination in the west and northwest part of the city. This company is acting under an ordinance granted March 21, 1892, authorizing it to construct an elevated road, the main line of which should extend from Fifth avenue, between Congress and Jackson streets, west to the city limits. Three branch lines are authorized, one from a point on the main line between Ashland avenue and Wood street, south to a point between Eighteenth and Twenty-second streets, and west to the city limits; another north from the same point to Milwaukee avenue, and parallel to Milwaukee avenue, between a line 400 feet

over property on the short section between Canal and Jefferson streets will soon be adjusted and the structure erected.

At the present time construction is being pushed along the Milwaukee avenue branch of the road. The structure is already completed, except for the laying of the rails and the building of the stations up to a point near North avenue. The necessary right of way along this line has been secured and the foundations are being laid and the structure erected as fast as possible. The work is already well advanced on the stations along this line and it is probable that the branch will be ready for opera-

tion as soon as the motive power equipment is on hand and in working order. The work of construction has not yet been commenced on the branch west of North avenue.

It will be observed that this line crosses the Lake Street Elevated Road a short distance west of Paulina street. Fig. 3 shows the crossing of the two roads at this point, the structure of the Metropolitan road clearing the rails of the Lake Street Road by about 14 feet. The columns supporting the structures of this portion of the Metropolitan Road are all of a standard length for level track and are placed upon masonry piers of suffi-

an average height of 70 feet. Only one-half of this is to be put up at present, the remainder of the structure being added as the extensions of the lines demand an increase of power. The building will be of steel construction, with red brick walls and slate roof, and will be fire-proof. The engine room is to be 300 feet long and will afford space for eight engines. The boiler equipment will be in a separate house and will consist of 36 boilers of 300 horse-power each.

The station equipment consists of four engines from the E. P. Allis Company of Milwaukee, two of which are of 2,000 horse-power and the other two of 1,100 horse-power. These engines will be vertical, direct connected, cross compound condensing engines of a new design. The dynamos are to be furnished by the General Electric Company; two of them are to be of 1,500 kilowatts and two of 800 kilowatts capacity.

The power plant between Throop and Loomis streets when completed will occupy the entire space bounded by the tracks and the two streets. The building shown in the background is an electric light plant owned by the city and will shortly be torn down and removed. The illustration shows the two track structures at the south of the power house. A similar structure carrying the other two tracks will be built over the boiler house on the opposite side of the excavation for the foundations.

This road, when completed, will doubtless be the best equipped elevated road in the world. All details have been carefully and thoroughly worked out, and no expense has been spared to make the road as nearly perfect as possible.

The subject of down-town loops or terminals is one that has not yet been satisfactorily solved. A double track loop covering a large part of the down-town district would probably best accommodate the patrons of all the roads, and several plans for such a loop have been brought up, either by parties interested in some of the roads or by outsiders who propose to build the loop and make arrangements with the various roads for the handling of their trains. The plans proposed by the roads themselves or those interested have not, as a general thing, provided for the accommodation of all the roads. It is reported that the management of the Lake Street and the Northwestern Elevated roads have offered to build a loop for the accommodation of themselves and the "Alley Elevated." This would probably not be satisfactory, as it seems more probable that the Alley Elevated and the Metropolitan Roads will build a loop for joint use, unless the management of the Northwestern and Lake Street roads acquire the control of the "Alley Elevated," which it is reported, may be done. The management of the Metropolitan Road have given out none of their plans for getting farther into the business district, but appear to be concentrating all their energies upon the completion of their main line and branches and the early operation of the road.

A call has been issued for a special meeting of the stockholders of this company on Nov. 9, to pass upon a plan for further encroachments upon the territory of the Lake Street and Northwestern roads, it being proposed to run a branch northward parallel to the lines projected by the other two companies, and one south from the main line parallel to Halstead street along which the Lake Street company filed a route last January. Other branches and feeders are also proposed. This action of the officials of the Metropolitan has been variously interpreted, some professing to believe that it is an attempt to force the management of the Lake Street & Northwestern roads to unite with the Metropolitan in a downtown loop, while others claim that the announcement results from efforts on the part of those interested in the Lake Street and Northwestern roads to gain control of the Metropolitan road through the purchase of the stock of the West Side Construction Company, the company organized to build the road. The officials of the Metropolitan deny that there have been negotiations for the sale of any of its property, and claim that the announcement merely means that it is proposed to protect the lines now under construction and nearly completed by the construction of branches and feeders, and make the property a paying investment. There seems to be a general feeling, however, that no one need be greatly surprised, if within two or three years, all of the elevated lines named, together with the surface lines of the North Chicago and West Chicago street railroad companies, are under one management, thus leaving the Chicago City Railway Co. as the only independent transportation company in the city.

This question of down-town terminals is probably the most important one with which the roads have to deal at present. Later on, the construction of branch lines will probably be taken up. It would appear that the present lines, when provided with proper down-town terminals, will be able, with the help of branch lines, to serve the territory about Chicago in a very effectual manner. A number of steam surface roads are now doing a good suburban business, which will probably increase. Among the more important of these are the Illinois Central, Chicago & North Western and the Chicago, Burlington & Quincy. The Chicago & Eastern Illinois, the Lake Shore & Michigan Southern, the Chicago Rock Island & Pacific, the Pittsburg, Ft. Wayne & Chicago, and the Chicago Milwaukee & St. Paul are also doing some suburban business, with prospects of a considerable increase as the population of the towns along their lines increases. The surface roads, however, do not affect the elevated roads so much as might be expected from the number of

passengers carried, as the greater part of their traffic is from points beyond those to which the elevated roads are likely to extend.

The elevated roads will, when provided with branches and suitable terminals, perhaps reduce the earnings of the horsecar and cable lines, as they are naturally preferable for long hauls. The street railroad companies are, however, equipping the greater part of their horse car lines with electricity, and are making a strong effort to hold their own against the elevated lines.

The section of the city which is most in need of better transportation facilities is that into which the Milwaukee avenue and North avenue lines of the Metropolitan Company will extend. The territory is very thickly settled, but is dependent upon the cable lines on Milwaukee avenue and West Madison street and a few cross town lines with horsecars.

The main line of this company will probably do a good business also, though it is paralleled by the Madison street cable line and several horse car lines, as well as the main line of the Lake Street Elevated Railroad. There is a large territory along this line, which, although at present thinly settled, would be very desirable if furnished with rapid transit facilities. The same may also be said of the main line of the Lake Street Elevated Road, though it has considerable competition in the suburban service of the Galena division of the Chicago & Northwestern Railway. It has the advantage, however, in getting further down town, and in running trains oftener. The north branches proposed by the Lake Street and Northwestern Elevated Companies, though passing through much well-settled territory, will have to meet the competition of the suburban service on the Milwaukee division of the Chicago & Northwestern, and the Evanston division of the Chicago, Milwaukee & St. Paul Railroads, and divide the remaining traffic with the lines of the North Shore Electric Company and the North Chicago Street Railway Company.

The "Alley Elevated" is at a considerable disadvantage in having on one side the State street and on the other side the Cottage Grove avenue cable lines of the Chicago City Railway, and in having to compete at its lower end with the express service of the Illinois Central Railroad, on which the run up town is made in about one-third of the time required on the elevated line. Notwithstanding these disadvantages, the line could probably be made a success if conducted and operated on an independent basis. The territory through which it runs is by no means thickly populated, though quite desirable, and the road will sometime be in a position to do a paying business.

American Railway Association.

The regular fall meeting of this Association was held in New York City on Oct. 17, over 100 representatives being present. The membership of the Association is now 179 companies, operating 145,000 miles of road. Colonel H. S. Haines, the President of the Association, who has presided at every meeting since 1887, was detained at home by sickness and the chair was occupied by Mr. E. B. Thomas, First Vice-President of the Association.

The first business before the meeting was a communication from the International Railway Congress inviting the Association, which is styled a "syndicate of railway managements," to become a member of the Congress. The invitation was unanimously accepted, and, on the recommendation of the Executive Committee, a resolution was passed requesting Colonel Haines to become the representative of the Association at the meeting of the Congress to be held in London in June, 1895. The resolutions were in terms highly complimentary to Colonel Haines, and contained a paragraph instructing the Executive Committee to pay his expenses to the Congress. A telegram was at once sent to Colonel Haines notifying him of the action of the Association. Under the terms of the invitation the Association is entitled to eight delegates.

The Executive Committee presented a communication from the Master Car Builders' Association asking approval of the M. C. B. Association's adopted standards of details of car construction. The Executive Committee presented a resolution endorsing these standards, and it was adopted. The M. C. B. Association also sent a communication concerning a standard wheel and track gage. The Executive Committee was ordered to appoint a committee of three to take up this subject and to confer with the Master Car Builders' and the Roadmasters' Associations; if these conferences result in a satisfactory conclusion the Executive Committee is to take a letter ballot, with power to declare the result thereof the standard of the Association, if it shall see fit to do so.

Mr. Willard A. Smith representing a committee of the Master Mechanics' Association presented a request for assistance in the proposed co-operation in locomotive tests at Purdue University. The Executive Committee, however, did not recommend action on this request at present. The sentiment of the meeting seemed to be that in the present stage of the matter it ought to be managed wholly by the Master Mechanics' Association. Several general managers who were not in favor of taking action at this meeting manifested the intention to favor the tests through their mechanical departments.

The Car Service Committee presented a report suggesting that a vote be taken as to whether the rate on interchanged freight cars ought to be 5 mills or 6 mills a mile, but after a statement of the present movement to

secure uniformity as between the Eastern and Western railroads, the Association decided to take no action at present. A resolution was passed requesting the committee to consider the practicability of the adoption of straight per diem and report at the next meeting. The report of this committee presented a summary of the replies received from railroads which for the first half of this year kept both a mileage and a per diem account of foreign car movements. On 69 roads, for the six months, the mileage of borrowed cars was 575,703,865 and the number of days on which per diem would have applied was 21,478,732. At 7½ mills a mile the mileage equalled \$4,317,779, which is equal to 20.1 cents a day; or to 5 mills a mile and 6.75 cents a day. These results tend to bear out the conclusions of the committee presented in April, 1893, when it was estimated that 5 mills a mile and 6 cents a day would produce results equal to 7½ mills a mile.

The Committee on Safety Appliances gave notice of a slight change in its circular regarding the position of hand holds and grab irons on freight cars.

The Joint Committee made a report on block signaling, recommending certain alterations in its signal definitions, designed to meet the criticisms made at the spring meeting. It was again stated that the matter presented by this committee was only for information and discussion. An interesting debate followed, during which it was developed that the feeling in favor of the use of green lights instead of white for safety signals at night is rapidly growing among members of the Association. This committee also presented the following report on Colored Lights.

The committee has made some observations with colored lights other than red and green for the purpose of finding one which will answer for a caution signal where red is used for danger and green for safety. It is now generally conceded by scientists that there are but three primary colors, red, green and blue, and that all other so-called colors are produced by different combinations of these three. Two of these, viz., red and green, have already been adopted as standard signal colors, and it will probably be apparent from what follows that we cannot make use of the primary color blue, or violet, for signal purposes.

Accurately speaking, it is not the office of colored glass in a signal lamp to change the color of the light passing through it. The fact in the case is that the glass adds nothing to the light given out by the lamp. It simply absorbs a large part of the light, destroying it as far as the sense of sight is concerned, and allows to pass through it and reach the eye of an observer only such rays as correspond with the color of the glass. To illustrate: If a piece of red glass is placed before a source of light, it absorbs both the green and the blue rays, so that they are not seen, and allows the red to pass through, and in this way apparently changes the color of the light to red. It is also true that, if there were no red rays in the source of light, a red glass would allow no light to pass through it to be seen, as it would absorb the green and blue, and, there being no red rays, there could be no light transmitted by the glass. It is evident from this that the character of the light from a signal lamp has an important bearing on the subject.

The application of the foregoing to the subject in hand is made as follows: Three distinct colors are wanted for signal lights. One for danger; for which red is the accepted standard. Another for safety; for which green is available. Leaving but one primary color to use for caution, viz.: blue. This cannot be satisfactorily used for the following reasons: The light given by a kerosene lamp is composed almost entirely of red and green, the combination producing yellow. The blue rays are few. It therefore follows that, as a blue glass will absorb the red and green, allowing only the small amount of blue in the flame to reach the eye, a blue signal light produced by a kerosene lamp will be feeble and indistinct. Actual tests corroborate this conclusion. If the source of light gave a pure white, which would contain blue, as well as the other colors, it is possible that blue could be used for caution. The committee is, however, strongly impressed that it could not be used successfully, because blue, or violet, at its best, is but a feeble color, and can scarcely be seen at a distance of 1,000 ft. Amber, or yellow, is a combination of red and green. The glasses of this color give a bright signal which can be seen as plainly as either the red or green at any distance; but, when the color is deep it might easily be taken for red, and when not so deep could not be definitely distinguished from a white light.

It seems reasonably certain from the theoretical considerations presented that there will be no satisfactory colored light found for a caution signal if green is used for the clear signal, and therefore some combination of lights would have to be used for this purpose. If it is thought best not to use a white light for any signal purpose, it will necessarily follow that this combination will be red and green.

It has been found in actual practice that a caution signal of red and green in combination, placed about nine inches apart, and illuminated from one source of light, can be used successfully and be clearly seen as separate and distinct signal colors at a distance of more than 2,500 ft.

It would therefore appear to the Committee that the use of colored lights in combination is practicable for cautionary signal purposes.

For the greater part of the foregoing information the committee is indebted to Mr. C. H. Quereau, Engineer of Tests, Chicago, Burlington & Quincy.

The Committee on General Regulations for Employees, which has now been made a standing committee, presented an elaborate code of rules for employees, covering subjects not treated in the standard code. The nature of the code thus presented was explained in the *Railroad Gazette* of Oct. 12, page 704. The committee hopes to take up and discuss this code in detail and perhaps digest some or all of it sufficiently to present it in shape for action at the next meeting.

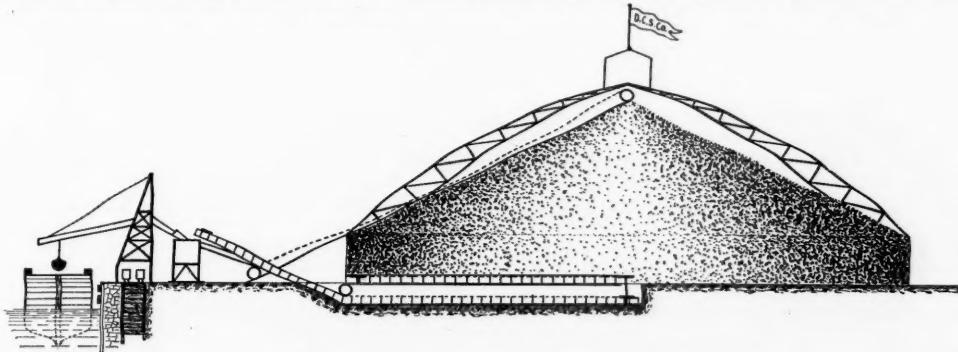
The Wabash, the Chicago, Milwaukee & St. Paul and the Norfolk & Western were re-elected to the Car Service Committee. The Richmond, Fredericksburg & Potomac, the Chicago & Northwestern and the Philadelphia & Reading were re-elected to the Safety Appliances Committee. The next meeting of the Association will be held in St. Louis on April 7, 1895.

Lehigh Valley Coal Storage Plant at West Superior.

The equipment of the Lehigh Valley Coal Company's new dock at West Superior, Wis., involves novelty of design, rapidity of operation and economy in costs of handling, which have attracted much attention and deserve more complete description than has yet appeared. The dock itself, which is solidly filled in with sand, comprises about 500,000 square feet, and has some 800 feet frontage. Upon this space, from the designs and under the superintendence of the Dodge Coal Storage Co., Nicetown, Pa., a plant is being erected which will combine

and operated by power, will be brought into service. This conveyor, moving upon circular tracks, will attack either side of the remaining coal, drawing it to the center of the building and there discharging it into the tunnel conveyor beneath. In all of these operations the prominent feature is the flowing or sliding of the coal and the avoidance of breakage.

That part of the dock lying to the north of the anthracite plant is to be occupied by machinery for handling bituminous coal. This machinery consists of a double-run reversible Dodge conveyor about 300 ft. long, parallel to the face of the dock, which delivers the coal



Sketch of the Dodge Coal Storage as used at West Superior.

maximum of storage capacity and of facility for receiving and re-shipping both anthracite and bituminous coal. The "Dodge system," by which the anthracite coal will be handled, is familiar to the coal roads of the East, where it has been in use since 1889. Records of the various plants fully warrant the conclusion that cost of handling by this system at West Superior, inclusive of the work of unloading vessels, will not exceed 5 cents a ton.

The plant will be encircled by a railroad track, which, entering the dock at the southern end, runs up-grade along the rear to a car platform 15 or 20 ft. high; ascends along the north side, separates at the water front into a double track and traverses the face of the dock to the place of entrance. The space encircled by this track will be occupied by, first an anthracite storage plant consisting of two circular buildings with parabolic roofs. Each building is 246 ft. in diameter and about 100 ft. high at

received either directly from the vessels or from the storage ground, into a reloading pocket adapted to discharge it into box cars. In connection with this conveyor there will be operated a second reversible conveyor mounted upon a truss 245 ft. long, carried by towers 30 ft. in height, and adapted to move widthwise of the storage ground, remaining at all times at right angles with the line of the wharf conveyor. This traversing conveyor will receive coal from the wharf conveyor and deposit it upon storage ground within its range of travel. For reloading, the stored coal will again be delivered to the traversing conveyor by two automatic shovels attached to the conveyor, and being carried to the wharf conveyor will by it in turn be delivered to the reloading pocket.

Both anthracite and bituminous coal will be discharged from vessels by the Bogle system; three Bogle towers mounted on tracks parallel to the face of the dock, will be employed, and as each will be operated indepen-

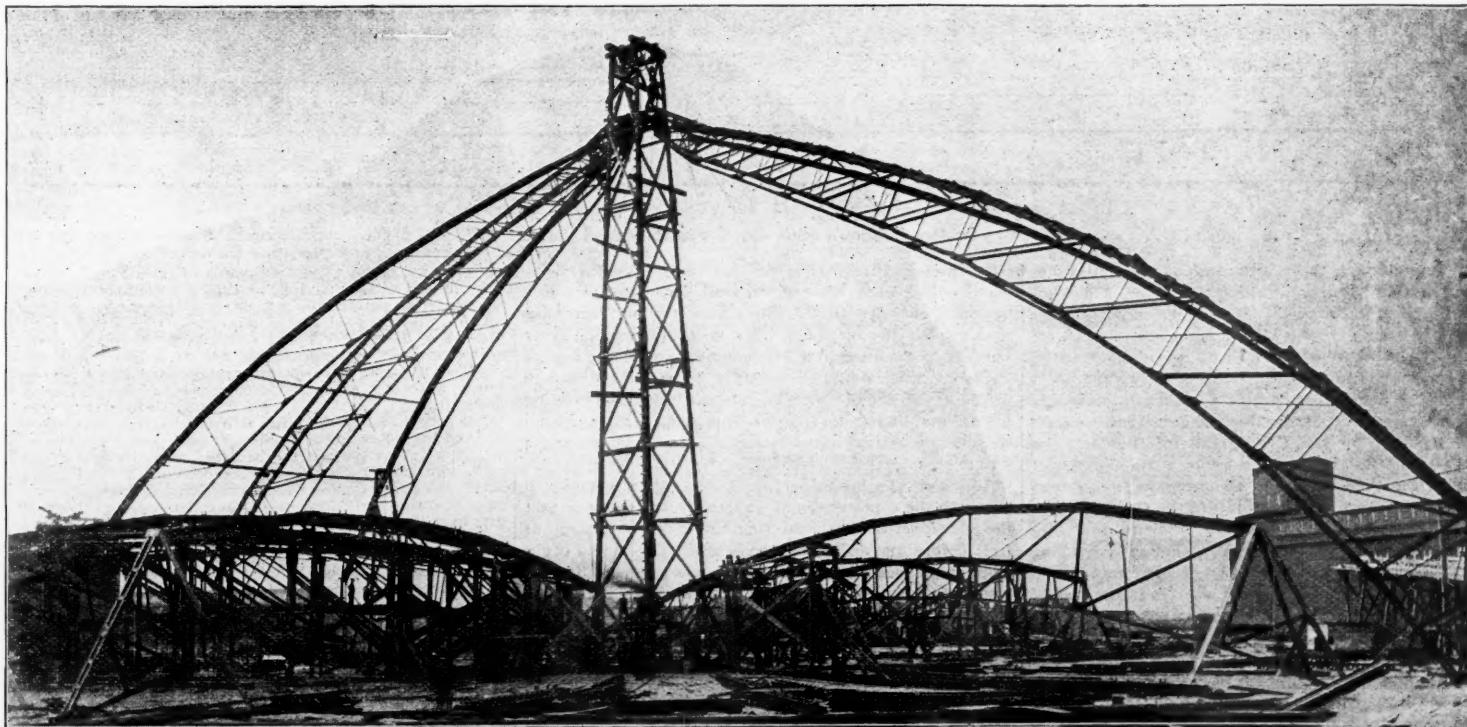
be largely used for the transmission of power, and wire rope haulage will be employed for the movement of cars through the dock.

Passenger Fares in England and America.

As the Editor of the *Railroad Gazette* assumes—and doubtless he is in a position to judge—that Mr. Prout in *Scribner's Magazine* puts forward his comparison of English and American railway fares "somewhat experimentally" and "would like to have it torn to pieces by any American or Englishman who can demonstrate that the conclusions reached are wrong," perhaps you will allow me space to show that the main conclusion, namely, that the average English fare is lower than the average American, is quite unquestionably right. Perhaps I may say to begin with that I am surprised to learn that this is news to American railroad men who have studied the subject.* Of course I was aware that Mr. Dorsey took our average fare at 2.33 cents per mile, and that General Horace Porter in his article on Railway Passenger Travel, in the volume entitled "Railways of America," gave the general reader to understand that our fares were rather more than 100 per cent. higher than yours, but I didn't suppose that either of these statements was intended to be taken seriously.

What your fare is I will take without question from your official returns. They state that in 1892 it averaged 2.14 cents per mile.† I assume that this excludes the receipts of the Pullman and Wagner companies on the one hand, but that on the other hand it includes for instance rebates given to scalpers with whom blocks of tickets are placed for sale in times of "war." In the absence of statistics our English average cannot of course be given with accuracy. But that it is less than 1d. (2 cents) per mile is absolutely certain. Apart from season ticket holders (of whom more anon) our railways carried in 1893 873 million passengers of whom all but 90 million were third-class. The number of third-class passengers who paid more than 1d. per mile is so fractional that it may be safely disregarded altogether. Ten years back there were quite considerable districts of the country where the third-class fares were as high even as 1½d. per mile. But there is only one such district now—a portion of the Great Western's South Wales system. Everywhere else the third-class fares have been reduced to the "Parliamentary" rate of one penny.

Assuming then, for the moment, that the third-class paid 1d. and that the first and second-class paid on the average



The Lehigh Valley Coal Company's Storage Dock at West Superior, Wis.

From a photograph taken during construction.

its apex. The coal will be stored in these by endless conveyors or trimmers of the Dodge system, which conveyors will be fed by chutes from pockets located near the face of the wharf. For re-shipment, the coal will be drawn from each of these buildings into a 6 ft. diameter cast iron tunnel, which extends from the center of the building to its circumference. Within this tunnel another chain conveyor will be operated, which, after drawing the coal to the circumference of the building, will carry it up an incline and flow it through screens into cars located upon either of the two tracks between which the screen house stands. The underground tunnel will receive coal within the buildings through openings provided with gates and chutes. When so much of the coal has been removed in this manner that it will no longer flow by gravity through the openings into the tunnel, a ground reloader, pivoted at the center of the building

duly of the others, either kind of coal can be discharged from any point of the dock front. The storage capacity of the plant is 145,000 tons, and cost of the entire equipment as above described will be considerably less than \$2 a ton. The arrangements for screening are very complete, and appear to insure both rapid work and thorough cleaning of the coal. Retail pockets are also provided in the general plan for convenience of the local trade. The general contract is in the hands of the Dodge Coal Storage Co., and being executed under their supervision. The Link-Belt companies supply the machinery. The work of erection is in the hands of the Barnett & Record Co., of Minneapolis, and the structural work is being furnished by the Allentown Rolling Mills, of Allentown, Pa. The Link-Belt Machinery Co.'s water tube boilers will supply steam to the various engines, which will be located conveniently. Manilla ropes will

1½d.—and this is certainly an ample estimate, for two-thirds of them were second-class and the second-class is generally a good deal less than 1½d. a mile—we should have 1.05d. as the average English fare. But now we come to the deductions from this possible maximum. In the first place there is the enormous season ticket travel. The season ticket receipts last year amounted to over 2½ millions sterling—one-twelfth of the entire passenger earnings in the country. Mr. Dorsey, a writer certainly not biased in our favor, estimated 10 years back that an English season ticket holder travelled on the average 600 miles for every £1; in other words, that is, paid ½d. per

* Probably it is not news to those who have studied the matter. Nine years ago Prof. Hadley came to the conclusion that English passenger rates were undoubtedly lower than ours; but the contrary notion is remarkably widespread and persistent.—EDITOR.

† The Interstate Com. Commission gives 2.126 in 1892 and 2.108 in 1893. Poor gives 2.143 in 1892 and 2.046 in 1893.—EDITOR.

mile. Even if we take the average rate at $\frac{1}{2}$ d., season ticket holders alone do much more to reduce our average mileage rate for all traffic below 1d. than the ordinary first and second-class passengers do to raise it above this point.

I will not enlarge upon the various special tickets at reduced rates, some of them, as, for instance, the bulk of the tourist and excursion tickets, only issued for the summer half of the year; others, such as workmen's tickets, market tickets, and afternoon half-holiday tickets, issued all the year round. The article in *Scribner's* has already called attention to them. But I should like to mention other derogations from the normal 1d. a mile standard, which are of very considerable importance. All over the North Eastern system third-class tickets are habitually issued at about 1.60d. per mile for the double journey. In Scotland also third-class returns always carry a large reduction. From Glasgow and Edinburgh to the north the return fare is frequently on the basis of 1 $\frac{1}{2}$ d. for the return journey. Then again, where railways come into competition with steamboat traffic, actual or potential, the rate is immensely below the 1d. a mile standard; e.g., Glasgow to Helensburgh and back (48 $\frac{1}{2}$ miles), the fare is 1s., 6d.; London to Tilbury and back (46 miles), 1s., 6d. also. A word should also be said of the class of reductions, the regulations for which occupy many pages in the official Clearing-House publications, which are given to members of cricket, football and other clubs, to bands of musicians, to volunteers in uniform, to theatrical companies, etc., etc. These are in force all the year round and may be said roughly to be at the rate of one single fare or 1 $\frac{1}{2}$ for the double journey.

But a reduction much more important than any of these is that caused by the fact that England is intersected in all directions by competing lines. Even in the direct fares to a given place this is important enough. For example, the Great Western carries more than half the traffic to Devon and Cornwall. But at Exeter, 194 miles from London by its route, it joins the South Western, whose road to London is 23 miles shorter; and the West of England fares are accordingly based, not on Great Western but on South Western mileage. Or again, the Midland competes actively for the traffic between Liverpool and London. Its distance is over 30 miles longer than the direct route, but the fares are of course the same. And it is not only the fares to Liverpool that are affected, but the fares to all the stations as far back as the point where the Midland mileage becomes equal to the North Western distance for the entire journey. There is no need to pile up instances of this kind. They can be found in hundreds all over the face of the country. Nor is even this the whole of the story. Take, for example, such a line as that of the South Eastern to Read-

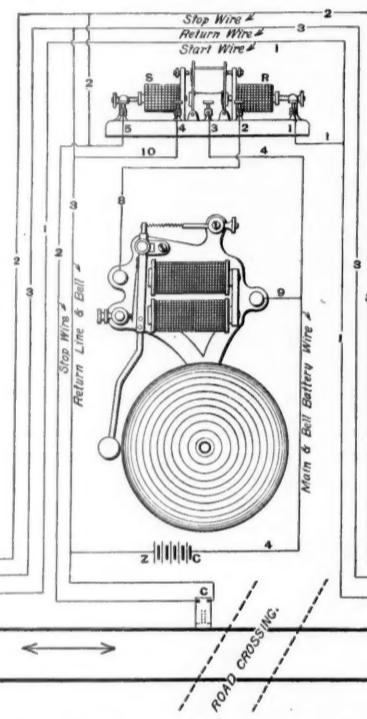
figure to be somewhere between .65 and .75 of one penny per mile; that it cannot be higher than .80 I feel absolutely sure. Why our Board of Trade, which publishes annually columns of railway statistics of no interest to any human being, has never called on the railway companies to furnish this most important information, or how, failing the Board of Trade, our railway companies, who are constantly told by their enemies—and they have many enemies and very few friends—that their fares are the highest in the world, fail to see the desirability in their own interest of furnishing precise statistics themselves, a mere outside observer must confess himself at a loss to imagine.

W. M. ACWORTH.

Selden & Riley's Highway Crossing Signal.

The expense of maintaining watchmen and gates at grade crossings of highways is so large that the use of electrical or other warning devices, which are operated by an approaching train, is a subject in which railroad managers are always interested, and the number of inventors seems to be multiplying. Among the devices now in the field is the "S. & R." signal, largely used on the Baltimore & Ohio and other railroads, including the Chesapeake & Ohio, the Long Island and the New York & New England.

This signal is the joint invention of Mr. Charles Selden,



Selden & Riley's Highway Crossing Signal.

ing. It runs through the very important residential districts of Highgate, Ridings, Dorking, Guildford, Aldershot and Workingham to Reading. When it reaches this latter town, nearly 70 miles from London, it comes in contact with the Great Western which has run straight as an arrow from London in 36 miles. Consequently at no point en route is the South Eastern able to charge a passenger more than 3s., which represents the normal 1d. a mile fare to Reading by the Great Western. Similarly the Great Western fares between London or Wilts and Dorset are cut by the South Western, operating, as the soldiers say, on interior lines, while in return the Great Western does the same for the very important Midland route between Birmingham and Bristol. For though your long and short haul clause has never been enacted into law in this country, and indeed is ignored entirely in the case of goods traffic, in the case of passenger traffic it is practically always respected. Indeed, the railway companies can hardly help themselves. For it is very unlikely that any court would be found to convict a passenger at ordinary fares—in the case of special excursion traffic the rule is otherwise—who should take a ticket for the longer, if cheaper, distance, and then get out at an intermediate station and decline to continue his journey.

To sum up. It is abundantly clear that the number of miles of passenger travel paid for at less than 1d. a mile is many fold greater than the number paid for above that figure. One might safely go further and say that for every mile travelled at more than 1 $\frac{1}{2}$ d., there are probably 100 miles charged at less than 1d. It is therefore quite certain that the average English fare is a good way below 1d. per mile travelled. Precisely how far below no one can of course say. For my own part I should expect the

¹The basis on which season ticket rates are calculated may be said to be 30s. first-class and 25s. second-class per double mile per annum. In return for this the passenger may be assumed to travel five times each way per week for 48 weeks. We have, therefore, 480 miles for 30s. per mile = 1d. per mile first-class, and 480 miles for 25s. per annum = 1d. per mile second-class. This is, however, for short distances. For long distances, which bulk largely in mileage, though not in number of tickets issued, the rate per mile is much lower, e.g., between London and Brighton, 50 miles, 2s.; between London and Cambridge, 57 miles, 2s. But further, though third-class season tickets are exceptional around London, around the great towns of Lancashire, Yorkshire and Northumberland, which have an enormous season ticket business, as also all over Scotland, third-class season tickets are universal. They may safely be put down as not more than 1d. per mile. Third-class return tickets are habitually issued.

The manner in which the signal is operated, on single track, is as follows:

A train starting at X will cause the lever in box E to make contact, closing the stop magnet S and holding the armature against it. The circuit enters the magnet S at 5 and goes to battery through post 3 and wire 4. At the next instant, the lever in box A is depressed, closing magnet R (through post 1, out at post 3 and by wire 4 to battery). This has a tendency to attract the armature in the other direction; but, the stop magnet S being the stronger of the two within the relay, the armature remains as first placed until the last wheel of the engine or train has passed off the box E; then the wheels continue to depress the lever of box A, thus closing the circuit through the magnet (R) attracting the armature, closing the local points, making the circuit through post 2, wires 8 and 9 to battery and return through wires 3 and 10. This causes the bell to ring. The bell will continue ringing until such time as another stop box, placed where it may be desired, is reached, when the current will again be diverted to the stop magnet of the relay and the bell will cease ringing. A train entering at point W will have exactly the same effect.

The diagram shows a metallic circuit; the signal will work with a grounded circuit; but, as is well-known, any signal employing metallic circuits is much less liable to trouble from the effects of lightning. The use of grounded or metallic circuits is entirely optional with the user.

Can the T-Rail be Satisfactorily Used in Paved Streets.

BY JOEL HURT, President Atlanta Consolidated Street Railway Company.

"We will endeavor to show that the T-rail is not only satisfactorily used in paved streets, but that it is the best rail for the purpose. The tendency in this country during the past ten or twelve years, has been toward smoother and better paved streets, and the public has become impatient at the action of the street railroad people in maintaining the old forms of rail which makes a ridge on the smooth surface of a street. Our city officials have in many cases forced either the English grooved rail or its American modification upon the railroad companies. No street railroad man hankers after the grooved rail before he gets it, or enjoys it after he has put it in, and he, therefore, fights its introduction, demanding to be left alone, as, he was, with his centre-bearing or five-inch tram head.

"For the street railroad man, questions of price, joints, quick delivery, competition, coal pile and construction, combine to recommend the rail. The old argument for the tram head—that the steel paving for the three inches is the cheapest in the end—no longer holds good.

"The general consensus of opinion of 26 roads, and of the officials of the cities in which they run, is that if you

can once get down a hundred yards of T-rail and make a decent job of the paving, neither the officials nor the citizens will permit you to use anything else in the future. In three of the other cities, where there is at present no T-rail, the T-rail is about to be made a requirement on the companies.

"Modern street railroad construction and street paving imply a broken stone, concrete or solid foundation, a high girder or T-rail, and a brick, asphalt or granite surface to the street in the large cities, or cedar block, cobble and macadam in the smaller ones.

"Asphalt or macadam can be paved as easily to a T-rail as to any other; they should be laid flush, and room should be made for the flange, running a railroad freight car, or other car, having a larger flange than the street car, over the track before it is opened for traffic. Bricks are now molded by many paving brick manufacturers to fit girder and T-rails, those for the latter allowing a small space for the flange of the car wheel. Whether it is more expensive to chip the corners of granite or Medina blocks or to leave them intact a short distance from the head of the rail and fill the space thus made with asphalt, creosoted wood or concrete, is open to question, but, in either case, a first-class job can be made. The writer is familiar with two excellent pieces of 56-pound T-rail construction on chairs, in one of which the pavement consists of 6-inch cedar blocks, and in the other of small 3 or 4-inch cobble stones, both paved close to the rail with no filling.

"It may be useful in arguments with city officials in favor of a T-rail, as against a grooved girder, to insist that a T-rail is a girder rail with a head differing less from that of the grooved girder than this does from the tram or centre-bearing head. Also the substitution, in this country, of the steel base and upright member of the girder for the wooden stringer, took place before the introduction of the grooved rail, and was due entirely to different causes and certainly has not been brought about by any demand for smooth streets originating with the cities or citizens. Such substitution is equivalent to that of steel for wood in buildings. The girder is an established fact; the grooved head, we hope, is merely a passing fancy. The grooved rail might easily be a big-headed T out of which a piece corresponding to the groove had been planed. This can easily be shown by reference to cross sections.

"Your committee has not gone more fully into the details of construction from a street railway man's point of view, because these must necessarily vary in different localities; but it suggests that the progress which has been made in girder rail construction in the past two or three years should not be lost sight of when we secure the T. Have it big enough and heavy enough.

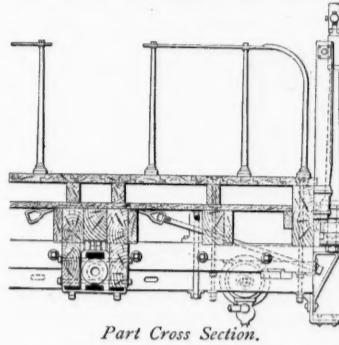
"Attached to this report, in the form of an appendix, is a list of the street railroads which have answered in-

²Extracts from a paper read at the Atlanta meeting of the American Street Railway Association.

queries, together with a synopsis of the answers, out of 178 letters sent out, but 80 responses were received and, as above stated, of the ninety-eight who failed to come to time, more than fifty are using the T-rail, but whether in paved streets or not is unknown."

Erie Poling Car.

The New York, Lake Erie & Western has recently introduced the practice of poling cars in some of its large yards, and three cars have been built especially for use in this work. "Poling," as most of our readers know, is the method of distributing the cars in a long freight



Part Cross Section.

Pennsylvania Railroad, where the plan was first extensively used, the pole is attached to the engine, the yard engine used for the purpose usually being fitted up so that cars can be pushed from either one of the four corners of the engine.

The aim of the Erie people in making a special car is to provide an appliance which makes it possible to use any engine for this service. It is often found convenient to use the road engines for distributing their own trains. The design of the car is clearly shown in the drawings. The pole is pivoted at the middle of the car, one on each side, the casting attached to the side sill being similar to the coupler casting used on the rear of

train by pushing them with a pole or stake from an adjoining track instead of backing them off by the locomotive attached to the train. The apparatus and methods were described in the *Railroad Gazette* in 1886, and again on Aug.

18, 1893. On the 7th, on Central of New Jersey, at Bayway, N. J., a passenger train which had been stopped in consequence of a burning freight car ahead of it, which had been set afire by tramps, was run into at the rear by an empty engine, about one minute afterward, doing slight damage. Just before the collision the passenger train started and a link connecting the engine to the train broke, allowing the engine to shoot ahead. In recoupling the engine to the train the baggage man was injured. There was a dense fog at the time.

8th, 3 a. m., on Central of New Jersey, near Bound Brook, N. J., a freight train ran into the rear of a preceding freight which was taking water; engineer killed. There was a dense fog at the time.

8th, on Fitchburg road, near the central shaft of the Hoosac Tunnel, a freight train ran into the rear of a preceding freight which had been stopped on account of the breaking of a spring hanger on the engine, making a bad wreck which blocked both tracks about 24 hours. Two brakemen were killed and 3 others were injured. The reports indicate that the block signal operator at the entrance of the tunnel admitted the second train before the first one had been reported as passing out of the block section. The section is about 5 miles long, the length of the tunnel.

18th, on Southern Pacific, at Belmont, Cal., a passenger train ran over a misplaced switch and into a freight train standing on the side track, wrecking 5 freight cars. Two brakemen were killed and 3 passengers were injured.

22d, on Atchison, Topeka & Santa Fé, at Elmdale, Kan., a freight train ran into the rear of a preceding freight standing at the station, wrecking the engine and several cars. The fireman jumped off just before the collision occurred and was run over and killed. It is said that the flagman of the foremost train had not time to go back with a signal.

28th, on Chicago & Northwestern, at Denison, Ia., a freight train standing at the station was run into at the rear by a following freight, doing slight damage. A man riding on one of the cars was killed. The standing train was not protected by a flag.

28th, on New York, Chicago & St. Louis, near Dunkirk, N. Y., a freight train ran into the rear of a preceding freight, making a bad wreck. The fireman was injured by jumping.

And 12 others on 12 roads, involving 5 passenger and 13 freight and other trains.

BUTTING.

4th, 11 p. m., on Cleveland, Cincinnati, Chicago & St. Louis, at Columbus, O., 8 loaded coal cars, which had become uncontrollable in the yard at Fifth avenue, ran out upon the main track about two miles and collided with a

men riding on the front end of the baggage car were killed. The engineer and one other trainman were injured.

9th, 8 p. m., on Chicago & Northwestern, near Barrington, Ill., a passenger train ran into a coal car on the Elgin, Joliet & Eastern at the crossing of the two roads, wrecking the engine and mail car as well as the coal car. The fireman was killed and 3 trainmen and 3 passengers were injured.

10th, 11 p. m., on New York, Lake Erie & Western, near Turners, N. Y., a freight train pulling out of a side track was run into by a heavy freight train approaching on the main line and 18 cars were derailed. The train on the main line had become uncontrollable in consequence of the absence of one of the brakemen who had got off from the train a few minutes before.

15th, 8 p. m., near Mineola, Tex., a passenger train of the Missouri, Kansas & Texas ran into some freight cars of the Texas & Pacific at the crossing of the two roads, making a bad wreck. One brakeman was killed and 3 passengers and 2 employees were injured. The freight cars had escaped, while being switched, from a freight train in the yard near by.

26th, on New York & New England, near Sandersdale, Mass., several cars of a freight train broke away on an ascending grade and ran back some distance and collided with a passenger train, making a considerable wreck. One freight car was burned up. The engineer was injured by jumping.

27th, on Chicago, Milwaukee & St. Paul, near Algona, Ia., a passenger train ran into a freight car which had been blown out of a side track, derailing the freight car and engine. The fireman was injured.

30th, 12.10 a. m., on Pennsylvania road, at 30th st., Philadelphia, a switching engine collided with a freight train; the engineer and fireman jumped off and the engine ran a short distance uncontrollable; it soon met a south bound passenger train, but both were moving at moderate speed and the collision was not very violent. The engineer and fireman of the passenger train, 2 postal clerks and 2 passengers were injured.

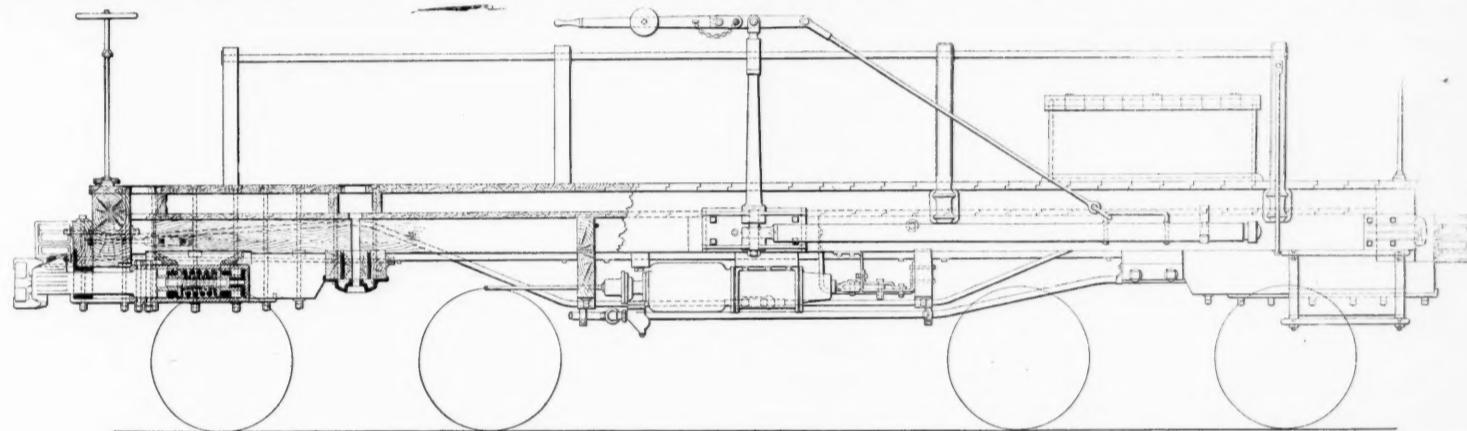
And 5 others on 5 roads, involving 3 passenger and 6 freight and other trains.

DERAILMENTS.

DEFECTS OF ROAD.

9th, on New Orleans & Southern, at Florissant, La., an excursion train was derailed and the engineer and one passenger were killed and several other passengers injured. A jury investigating the wreck recommended that the company be forbidden to operate the railroad until the track should be made safer.

19th, on Oregon Railway & Navigation, near Celilo,



Poling Car; New York, Lake Erie & Western Railroad.

tenders. The pole is a wrought iron tube 10 ft. long, and has inside a wooden pole about one foot shorter. In the outer end is a rubber cushion with a wooden nose or point, which can be renewed as frequently as may be necessary. Extra points are carried on the car. The car also carries an outfit of tools needed in yard work. On each side of the car a lamp is fixed in a post where it will best aid the man in charge. The lever for swinging the pole around, which is clearly shown in the engraving, is counterweighted, making its operation easy. Four seats are provided for the attendant as each pole can readily be swung around to push in either direction.

The car is 24 ft long, and is loaded with six tons of iron between the floors to give it the necessary stability. The total braking power is 35,000 pounds. Three of these cars have been built, two for use at Jersey City, and one for Newburgh.

Train Accidents in the United States in September.

COLLISIONS.

REAR.

1st, 3 a. m., on Philadelphia, Reading & New England, at East Winsted, Conn., a freight train broke in two and the rear portion afterward ran into the forward one, making a bad wreck. A house near the track was demolished and a man in it fatally injured.

2d, 8 p. m., on West Jersey road, at Camden, N. J., a passenger train ran into the rear of a preceding passenger train, badly damaging one passenger car. Two passengers were killed and 2 injured. The collision seems to have been due to a failure of block working. The foremost train had been stopped by the block signal operator at Van Hook station and had just started along when it was struck. It appears that this operator signalled back to Gloucester to send on the following train before he had even pulled off the signal for the foremost train to proceed out of the block. The coroner's jury thought the railroad company ought to be more careful in the selection of operators. The operator at Van Hook had been employed by the road only three months.

6th, 2 a. m., on Toledo & Ohio Central, near Pleasantville, O., a freight train, which became stalled in ascending a grade, was run into by a following freight. A brakeman was injured.

passenger train of the Baltimore & Ohio road. The collision occurred on a bridge and the passenger engine and the coal cars fell in the river. The fireman was killed and the engineer and one passenger were injured.

7th, on Delaware & Hudson, at Belden, N. Y., butting collision between a passenger train and an inspection train, damaging both engines. One passenger was injured.

7th, on St. Louis & Paducah, near Grantsburg, Ill., collision of freight trains, making a bad wreck; 5 trainmen injured, one of them fatally. It is said that the men on one of the trains made a mistake of 10 minutes in reading a time-table.

7th, on Southern Pacific, near Rowan, Cal., butting collision between a passenger train and a freight, injuring two firemen on the passenger train. Two baggage cars and 2 freight cars were wrecked. It is said that the passenger engineer disregarded an order to wait for the freight.

8th, on Philadelphia & Erie, near Lock Haven, Pa., butting collision between a freight train and a work train, the caboose of which was at the forward end. Two employees in the caboose were killed and two others were injured.

11th, 3 a. m., on Delaware & Hudson, near Glenville, N. Y., butting collision between a freight train and an empty engine, wrecking 11 cars. One brakeman was killed. The empty engine, which had been reversed, ran back towards Schenectady and travelled 11 miles before it was stopped.

12th, on West Shore, at Clyde, N. Y., an east bound passenger train standing at the station was run into by a west bound passenger train, doing considerable damage. A conductor was injured.

22d, on Kansas City, Memphis & Birmingham, at Wauville, Miss., a car being run into a side track became uncontrollable by the failure of the brake chain and ran out upon the main line some distance, where it collided with a gravel train, making a bad wreck. Three trainmen were injured.

30th, on Kansas City, St. Joseph & Council Bluffs, at Sugar Lake, Mo., butting collision between a passenger train of the Atchison, Topeka & Santa Fé and a Burlington freight, both running at good speed. One engineer, brakeman, and one brakeman were injured. It is said that the train dispatcher gave conflicting orders.

And 4 others on 4 roads, involving 8 freight trains.

CROSSING AND MISCELLANEOUS.

7th, on Wabash road, at Staunton, Ill., a passenger train ran into some coal cars which had broken away from a freight train, making a bad wreck. The engine, 2 baggage cars and one passenger car were wrecked and two

men riding on the front end of the baggage car were killed. The engineer and one other trainman were injured.

20th, 9.30 p. m., on Lake Shore & Michigan Southern, near 45th street, Chicago, 4 cars of a passenger train were derailed at a loose switch, loosened by a defective switchrod, and ran against a gateman's tower, which was demolished and the gateman fatally injured.

20th, on New York, Lake Erie & Western, near Great Bend, Pa., a passenger train was derailed by spreading of rails; fireman and several passengers injured.

22d, on Lehigh Valley, at Buffalo, N. Y., the engine of a switching freight train was derailed at a defective switch. Two trainmen were injured.

And 10 others on 10 roads, involving one passenger and 9 freight and other trains.

DEFECTS OF EQUIPMENT.

6th, on Lehigh Valley, at Wilkesbarre, Pa., the engine of a freight train was wrecked by the breaking of a driving wheel axle; a part of the wreck fell against a freight train passing on the adjoining main track and many cars were demolished. A man stealing a ride was killed and the fireman was fatally injured.

18th, 2 a. m., on Wabash Road, near Huntsville, Mo., the engine of a passenger train was derailed by the breaking of a driving wheel tire. The fireman was injured.

21st, 3 a. m., on New York Central & Hudson River, at Coldwater, N. Y., a freight train, running at good speed, broke in two and the rear portion was stopped so suddenly by the automatic application of the air brakes that the caboose and 3 cars were derailed.

23rd, 3 a. m., on Cleveland, Cincinnati, Chicago & St. Louis, at Harshmanville, O., a car in a freight train was crushed by the sudden stopping of the train by the engineer and several cars were wrecked. One brakeman was killed.

30th, on Chicago & Northwestern, near Woodstock, Ill., several cars in a freight train were wrecked by the breaking of an axle. Five boys riding in a car of lumber were killed and 2 others injured.

And 9 others on 8 roads, involving 9 freight trains.

NEGLIGENCE IN OPERATING.

3rd, on Lehigh Valley, at Jersey City, N. J., an engine backing from the wharf to a car float fell into the river, the fastening of the float giving way. The man on the engine jumped off, but was badly injured.

4th, on Fort Worth & Denver City, near Bowie, Tex., a freight train was derailed by a pile of spikes on the track and several cars were ditched. The engineer was injured. It is said that the spikes had been left upon the track by the repair men.

7th, on Atchison, Topeka & Santa Fé, at Dillon Junction, N. M., a passenger train was derailed at a misplaced switch and the engine and all the cars but two were ditched. The engine and the mail and baggage cars were overturned. Four trainmen were injured.

10th, on Cleveland, Cincinnati, Chicago & St. Louis, at Springfield, O., a freight train broke in two on a steep grade and 20 cars became uncontrollable and were derailed, falling down a bank. One tramp was killed and 4 were injured.

20th, on New York Central & Hudson River, at Mott Haven, N. Y., a passenger train ran over a misplaced switch and was derailed, falling against some freight cars standing on the side track. Two freight cars were wrecked and the engine and several cars of the passenger train were derailed.

27th, 1 a. m., on Lake Erie & Western, near Lafayette,

passenger train was derailed and several passengers injured.

6th, on Wabash Road, at Sibley, Ill., a freight train was derailed and a man stealing a ride was killed.

8th, on Wabash Road, near Saunemin, Ill., a passenger train was derailed and the engine and mail car were ditched. The engineer was killed and the fireman fatally injured.

8th, on Norfolk & Western, near Tazewell, Va., a work train was derailed on trestle and fell to the ground below. One employee was killed and several others injured.

10th, on Philadelphia & Reading, at Pottsgrove, Pa., a freight train was derailed and 15 cars were wrecked. One brakeman was injured.

11th, on Northern Central, at Mt. Vernon Station, Baltimore, the engine of a switching train was derailed at a frog and fell across the adjoining main track. A

cars and the whole train was destroyed. This catastrophe was reported in the *Railroad Gazette* of Sept. 14.

20th, on Philadelphia, Wilmington & Baltimore, near Harrington, Del., the engine of a freight train was badly damaged by the explosion of its boiler. The engineer, fireman and one brakeman were injured.

23rd, on Southern Pacific, near Blue Canon, Cal., the locomotive of a freight train was wrecked, while running through a snow shed, by the explosion of its boiler. The engineer and fireman were injured, the latter fatally.

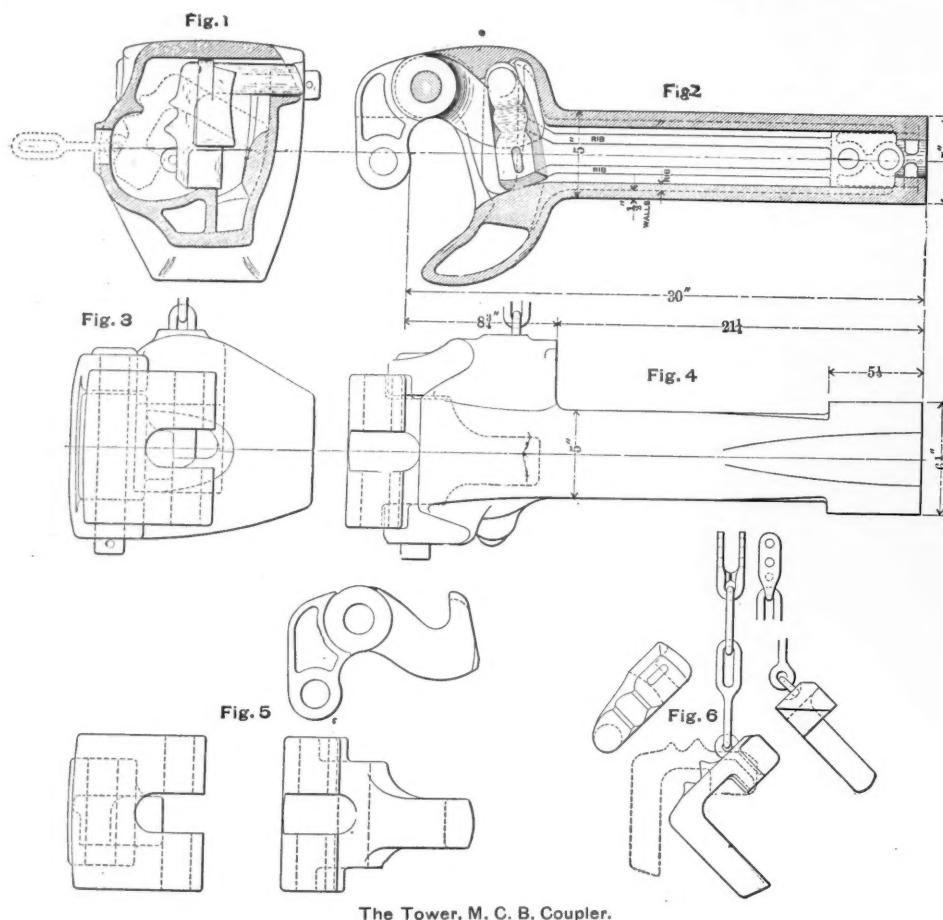
28th, on Old Colony, near Dedham, Mass., the engine of a passenger train was badly damaged by the breaking of a parallel rod. The rod on the opposite side broke immediately afterward and the driving wheels became locked so that they slid until the train stopped. The fireman was injured.

28th, 9 p. m., on Western New York & Pennsylvania, at East Aurora, N. Y., a car of naphtha in a freight train exploded and 23 loaded cars were burned up. Several other tanks exploded when the fire reached them, and a dwelling-house was set on fire.

And 3 others on 3 roads, involving 3 passenger trains. A summary will be found in another column.

The "Tower," M. C. B. Car Coupler.

The "Tower" coupler, which is shown in the engravings, is not a new device, nor is it the sudden product of a single effort of an inventor. As it stands to-day it is the result of the process of evolution, under the eyes of, and directed by, men who have been very familiar with the



The Tower, M. C. B. Coupler.

Ind., a freight train ascending a grade broke in two and the rear portion ran back to Lafayette, where it struck the passenger station, completely wrecking a large portion of the building as well as other buildings adjoining. A man in the station was fatally injured. The runaway cars would have collided with a passenger train standing at the station except for the alertness of Yardmaster Brightie, who threw a switch and turned the cars upon a side track.

29th, on Northern Pacific, at Kalama, Wash., some cars being pushed out on a ferry boat ran violently against a train standing upon the boat and pushed its engine off the end of the boat into the river; the fireman was drowned.

And 4 others on 3 roads, involving 2 passenger and 2 freight trains.

UNFORESEEN OBSTRUCTIONS.

1st, on Chicago, Milwaukee & St. Paul, near Pori, Mich., a freight train was derailed at a point where the ties had been burned by a forest fire, and the engine and 5 cars were wrecked and burned. The engineer's body was burned up and one brakeman was injured.

1st, on Philadelphia, Wilmington & Baltimore, at Philadelphia, a freight train was derailed by running over a coal wagon at a crossing and 4 cars were wrecked. Four trainmen were injured.

8th, on Vandalia Road, near Atlanta, Ill., a freight train was derailed by running over some cattle and 7 cars were wrecked. The engineer was killed and the fireman injured.

10th, on Hannibal & St. Joseph, near Chillicothe, Mo., a freight train was derailed by running over a bull and the engine and 7 cars of cattle were wrecked. The engineer was fatally injured.

12th, 3 p. m., on St. Louis, Iron Mountain & Southern, near Charleston, Mo., a passenger train was overturned by a tornado; 2 passengers were killed and 10 passengers and one trainman injured. One of the passenger cars took fire, but the flames were extinguished by a brakeman with hand grenades.

18th, on Pennsylvania Road, near Spruce Creek, Pa., a freight train was derailed by a landslide and 2 trainmen were injured.

21st, on Pittsburgh, Cincinnati, Chicago & St. Louis, at Carnegie, Pa., 3 cars of a freight train were derailed by running over the body of a tramp who fell from one of the cars to the track.

27th, on Seaboard Air Line, near Charlotte, N. C., a passenger train was derailed by a misplaced switch and the engine was overturned. The engineer was injured. It is said that the switch had been maliciously broken.

30th, on Wabash Road, at Maumee, O., a passenger train was derailed at a misplaced switch and the engine and 2 mail cars wrecked. The engineer and fireman were killed and 3 mail clerks injured. It is alleged that the switch was maliciously misplaced.

And 6 others on 6 roads, involving 4 passenger and 2 freight trains.

UNEXPLAINED.

3rd, on Chicago Great Western, at Valeria, Wis., a pas-

moment afterwards passenger train No. 4, approaching on this track, ran into the derailed engine, making a bad wreck. The engineer and fireman of the passenger train were injured.

14th, on Cincinnati, Jackson & Mackinaw, near New Weston, O., a passenger train was derailed and the engine and first 2 cars were ditched. The engineer was killed and the fireman fatally injured.

15th, 3 a. m., on Chicago, St. Paul, Minneapolis & Omaha, near Hammond, Wis., a freight train was derailed, wrecking several cars, among which were two tanks of oil. The oil took fire and burned up a large portion of the wreck, including a car of coal and the caboose.

About 11 a. m., while some passengers from a delayed train were standing near the wreck the second oil tank exploded with great force and 13 passengers and one employee were burned, 3 of them seriously.

19th, on Boston & Maine, at the Union Station, Boston, the engine of an inward passenger train was derailed, and fouled an adjoining track. An out-bound passenger train on the latter was derailed by running into the obstruction.

21st, on West Shore Road, near Bowmansville, N. Y., a car in a west bound freight train jumped the track and, after running more than a mile on the sleepers, struck the engine of an east bound freight train, badly damaging the cab and killing a brakeman. The fireman was badly injured.

23rd, on Boston & Maine, at Prison Point, Boston, Mass., a passenger train approaching a drawbridge was derailed and came near running into the river. A man riding on the platform of one of the cars was killed.

25th, 4 a. m., on Baltimore & Ohio, at Cherry Run, W. Va., a freight train was derailed and a brakeman injured.

27th, on Baltimore & Ohio, near Martinsburg, W. Va., a passenger train was derailed while running at considerable speed and all the cars were ditched, but only one passenger was injured.

28th, on Mobile & Ohio, near Columbus, Miss., a freight train was derailed and several cars fell down a bank. The conductor and one brakeman were killed and 4 other trainmen were injured.

29th, on Chesapeake & Ohio, near Williams Creek Tunnel, Ky., a freight train was derailed and 10 cars wrecked. A man riding on one of the cars was badly injured.

And 21 others on 17 roads, involving 4 passenger and 17 freight and other trains.

OTHER ACCIDENTS.

1st, on St. Paul & Duluth, at Hinckley, Minn., a south bound passenger train carrying about 200 passengers was nearly surrounded by the great forest fire raging at that time and was compelled to run back to Skunk Lake in order to save the lives of the passengers. After loading the cars full of residents of Hinckley, who were fleeing for their lives, the train was started back, but the intense heat burned the lagging and other wood work of the engine and the heat and wind together broke the windows of the cab. The engineer was badly cut by the broken glass and was also burned somewhat. Some of the passengers were burned to death after they got off from the



Fig. 8.—Lock in two positions.

in the position shown in the dotted lines and only falls into its normal position when the knuckle closes. The lock is held up by the extension backward of the tail of the knuckle as shown, and it slides on that extension as the knuckle closes until the knuckle has reached such a position that the lock can drop into place. The lock has a large bearing surface on the knuckle, the area of contact being $4\frac{1}{2}$ square inches. A link cannot enter the head far enough to hit the lock owing to the size and shape of the tail of the knuckle, and the lock is protected from ice, dirt or cinders.

The knuckle, the lock and the pivot pin are made of steel. The knuckle is fulcrumed back far enough to give great strength, combined with smooth action. In coupling, the outer face of the opposing knuckle comes in contact with the tail of the knuckle, closing it through that

contact. Buffing strains received on the knuckle are transmitted to the head by the broad flat bearing at the end of the tail, and the tendency of the knuckle to rotate inwardly under such blows is resisted at the same point and by a bearing against the vertical wall of the head near the fulcrum pin.

The body of the coupler is made of malleable cast iron. The shank is square throughout its length and the liner blocks are cast on it, and as will be seen from the section (fig. 2) the walls are thick and substantially ribbed. It is so designed that a tail bolt can be used and a slot for the American continuous draft rigging can be added.

Coupler Tests at Chicago.

Some very interesting tests of car couplers were made on Wednesday of last week, Oct. 17, at the works of the Chicago Tire & Spring Co., at Melrose Park, Ill. The couplers tested were, with three exceptions, to which reference will be made, all obtained commercially and were not made for test or trial purposes. Those tested were, the Janney, Gould, Trojan, Hinson, Buckeye, St. Louis, Chicago, Williams, Eureka, Ajax and California; the first five being of malleable iron, with steel knuckles, with the exception of the Janney, in which the knuckles were of wrought iron. The six remaining couplers were of steel with steel knuckles.

It was the intention that the couplers tested should be obtained from railroads using them in quantities, and that they be not taken from small trial orders nor from stock. The objects of the tests, aside from the records of actual breakages, were, the opportunity for a comparison of the fractures of the different materials, and to show the uniformity of the steel of the Chicago Tire & Spring Co. from a large number of different heats.

The knuckle, guard arm, and jerk tests, were made with a drop of 1,640 lbs. weight. The base of the drop is of steel, weighs 18,000 lbs., and rests on a masonry foundation 6 by 6 by 6 ft., laid on hard clay. The drop is therefore a very severe one, and it may, on this account, be unfair to compare the records obtained here with those of the same couplers on other drops.

Five of the Janney couplers were tested, two having the knuckle test, one the guard arm test and two a jerk test. The jerk test did not amount to much, however, as at the first blow at 5 ft., the tail bolt supporting one of the couplers was broken. The coupler receiving the guard arm test stood three blows at 3 ft., and broke across the shank at the second blow at 5 ft. In the knuckle test one withstood three blows at 5 ft. and broke across the shank at the third blow at 10 ft.; the other had two blows at 15 ft., the knuckle closing slightly at the first blow and the shank breaking just back of the head at the second.

Three Gould couplers were tried in knuckle, guard arm, and pulling tests. In the first the coupler withstood three blows at 5 ft. and two at 10 ft., cracking badly, but showing good looking iron. In the second test the coupler received three blows at 3 ft., and two at 5 ft., the guard arm breaking off. The pulling test was made in a horizontal hydraulic machine, a Gould and a Chicago coupler being tested together. At 139,750 lbs., the lugs of the Gould coupler were broken off.

Of the Hinson couplers at hand, four were tested, two with a jerk test and one each with the knuckle and guard arm tests. In the knuckle test the coupler withstood three blows at 5 ft., breaking on the first blow at 10 ft. into several pieces. In the second test the guard arm was broken off at the first blow at 3 ft. The coupler fared but little better in the jerk test, both lugs being broken by the first blow at 3 ft.

Two Trojan couplers were tested, the first withstanding three knuckle blows without damage, but bending in the shank at the first blow at 10 ft., and breaking at the second; the other in the guard arm test began bending at the first blow at 3 ft., and at the second the guard arm broke off.

A Buckeye coupler in the knuckle test cracked at the first blow at 5 ft., the head breaking up at the second. Another, in the guard arm test, cracked across the shank at the first blow and was retired after the third blow at 3 ft.

The steel couplers fared somewhat better, all things considered, though in some cases the results were very unfavorable. The Eureka coupler, manufactured by the Solid Steel Co., of Alliance, Ohio, had two knuckle tests and two guard arm tests. In each case in the knuckle tests the shank cracked at the first blow, and broke at the second blow at 10 ft. In the first guard arm test the bar was broken at the first blow at 3 ft., while in the second the coupler withstood three blows at 3 ft., cracked at the first and broke at the second blow at 5 ft.

The Ajax coupler, manufactured by Shickle, Harrison & Howard, St. Louis, showed a crack in the lower lug at the second blow at 5 ft. in the knuckle test, and at the first blow at 10 ft. the shank broke just back of the head. Several other fractures were also noticed. In the guard arm test the bar was badly damaged at the first blow at 3 ft., and was taken out after the second. Two St. Louis couplers, made by the above firm, were also tested, one with a jerk test, the other with a guard arm test.

In the first, the couplers stood three blows at 5 ft. with an average total deflection of 5-16 in. At the first blow at 10 ft., the shank of one coupler broke, the lower lug broke, the knuckle broke through, and the upper lug cracked. In the guard arm test the shank broke back of the head at the third blow at 3 ft. Three St. Louis couplers, manufactured by the Chicago Tire & Spring Co., fared rather better. In the jerk test there was an average total deflection or opening of the knuckles of 3-16 ins. after the third blow at 5 ft. At the first blow at 10 ft. the knuckle of one of the couplers broke through

the pin hole. In a knuckle test one of these couplers successfully withstood the three blows at 5 ft. At the first blow at 10 ft., the American Continuous Drawbar slot began to open slightly. The shank began bending at the first blow at 15 ft., and at the second blow the tail end of the shank was considerably battered down. In the guard arm test the coupler withstood three blows at 3 ft., and four blows at 5 ft. At the fifth blow a crack appeared across the face, which opened at the following blow.

The Williams coupler, also manufactured by the same concern, showed no signs of damage until the second blow at 10 ft., when the knuckle began closing slightly. At the third blow at 15 ft., the side of the shank began caving in, and at the sixth blow at 15 ft. the knuckle broke. In the guard arm test no damage was done by the three blows at 3 ft. At the first blow at 5 ft., one of the guard arm ribs began to bend and at the following blow the guard arm was broken.

The California coupler, also made by the Chicago Tire & Spring Co., withstood three blows at 5 ft., three at 10 ft., and five at 15 ft. The knuckle began closing at the first blow at 10 ft., and the shank began bending at the first blow at 15 ft. In the guard arm test a slight crack appeared under the head at the third blow at 3 ft. At the fourth blow at 5 ft., a crack appeared across the face of the coupler, and at the fifth blow the guard arm broke.

The fact that the three couplers last mentioned were taken from the stock of the Chicago Tire & Spring Co., may detract somewhat from the force of the statements made concerning them. The company claims, however, that these couplers were made from regular heats and that the results can be duplicated with couplers obtained from any roads using them. It was intended to obtain these bars from purchasers for test purposes, but those ordered did not arrive in time and will be tested later in order to complete the records of the company.

The tests which were made of the Chicago couplers would seem to bear out the claims made by the company for its steel. These couplers were obtained from the Chicago & Northwestern and Chicago & Eastern Illinois Railroads, and were selected by disinterested parties. In the knuckle tests one coupler withstood three blows at 5 ft., three at 10 ft., and two at 15 ft., before showing signs of failure. At the fourth blow at 15 ft., the knuckle cracked in the back, and after the fifth blow the coupler was taken out, showing the shank badly bent and slightly cracked. Another coupler selected from the C. & E. I. lot as being a bad one, had three blows at 5 ft., and three at 10 ft., the tail end of the shank then being badly split and battered by reason of a crack or cold sheet in the metal. In the guard arm test the coupler withstood three blows at 3 ft., three blows at 5 ft., and was given two blows at 10 ft. At the first blow at 10 ft., a crack opened in the face of the coupler, and at the second blow at 10 ft., the guard arm broke off 5 ft. The coupler already mentioned as having withstood a pull of 139,750 lbs., showed a slight crack on the inside of the knuckle, but no other damage. A jerk test made with two of these couplers resulted disastrously to the drops. The couplers stood three blows at 5 ft., and three at 10 ft., with an average total deflection of about $\frac{1}{2}$ an inch. The drop was then raised to 15 ft., and the yoke connecting the two couplers upon which the drop fell, was broken, no further damage resulting to the couplers.

These tests were made by Robert W. Hunt & Co., under the superintendence of Mr. J. C. McMynn, and were witnessed by a small party of railroad men from Chicago and vicinity.

American Street Railway Association.

The thirteenth annual convention of this Association was held at Machinery Hall, Piedmont Park, Atlanta, Ga., October 17, 18 and 19. The meeting was very largely attended; in fact it was the largest and most successful convention so far held.

On Wednesday the meeting was called to order at 11 o'clock by President Henry C. Payne. The Secretary, William J. Richardson called the roll, which was followed by an address of welcome by the retiring Governor of Georgia, W. J. Northen, President Payne responding. The annual address was then delivered by Mr. Payne. A paper on "The Best Treatment of Accidents and Complaints," by John D. Parsons, General Manager of the West Chicago Street Railway, was read by P. M. Dyer, of the same road; discussion followed. A paper by H. I. Bettis on "A Standard Form for Accounts for Street Railroads," was read by W. J. Richardson, Secretary of the Association. Following this was a report of the Executive Committee. The meeting adjourned at 2 o'clock. At 4 o'clock a number of the delegates visited in a body the power house of the Atlanta Consolidated Street Railway. In the evening a reception was given at the Capitol City Club.

On Thursday, at the meeting of the Executive Committee, a telegram of greeting from the National Electric Light Association was read, and letters from Cincinnati, Philadelphia and Montreal requesting that the next Convention be held in one of those cities.

After the appointment of committees a paper was read by Mr. Joel Hurt, entitled "Can the T-Rail be Satisfactorily Used on Paved Streets," of which an abstract appears in this issue. During the afternoon session the paper on "Mail, Express and Freight Service," an abstract of which we gave last week, was taken up. After the closing of the session a number of the delegates took a trip over the lines of the Atlanta Traction Company. The annual banquet was given in the evening at the Kimball House.

On Friday, after the session had been called to order,

the paper on "City and Suburban Street Railways," an abstract of which appeared in our last issue, was taken up. Chairman McLean, of the Committee on Nominations, then reported the following list of new officers and they were all elected unanimously:

President, Joel Hurt, Atlanta; First Vice-President, W. M. Cunningham, Boston; Second Vice-President, J. B. Harrison, Terre Haute, Ind.; Secretary and Treasurer, W. J. Richardson, Brooklyn, N. Y.; Executive Committee, Henry C. Payne, Milwaukee, Wis.; General W. H. Jackson, Nashville, Tenn.; D. G. Hamilton, St. Louis and Chicago; G. C. Cunningham, Canada, and John M. Partridge, New York.

It was then decided to hold the next Convention in Montreal.

In view of the many questions of insurance arising out of the meeting it was moved and carried that a committee on insurance be appointed to make report at the next session of the Executive Committee. The committee will be as follows: Russell B. Harrison, Chairman, Terre Haute; A. G. Dyer, Augusta, Ga.; L. Perrine, Trenton, N. J.; Mr. Lusher, Montreal, and Mr. Baumhauff, St. Louis. Secretary Richardson reported some proposed amendments to the constitution and by-laws of the Association, which, after some discussion, were adopted.

A paper was then read by Russell B. Harrison, President of the Terre Haute Electric Railroad and a son of ex-President Harrison, on "T-Rail Construction of the Terre Haute Street Railway Co., Terre Haute, Ind."

Several special papers were read by title only, owing to the haste of the Convention to adjourn. The Convention adjourned at half past one o'clock, until the next meeting in Montreal, October, 1895.

The Southern, Shenandoah Valley and Seaboard Air Line Railroads deserve great credit for the way in which they took care of the guests to the Convention. Special trains were run by each of these roads, the Southern carrying the largest portion. This train was in charge of Mr. Geo. C. Daniels, Travelling Passenger Agent of the road, and great credit is due him for the way in which he conducted the party. Mr. H. J. Ellis, Eastern Passenger Agent of the Shenandoah Valley, took charge of that train.

The return trips were especially attractive. The Southern and Shenandoah Valley trains both stopped at Chattanooga and the delegates had a chance to visit the battle fields of Lookout Mountain and Missionary Ridge. The two parties left on one train at 6:30 o'clock Saturday evening, the Shenandoah Valley section leaving the Southern at Knoxville and returning to New York via the Natural Bridge of Virginia and Luray Caverns, at which places short stops were made.

The Southern train reached Asheville, N. C., early Sunday morning. After breakfasting at Battery Park the delegates boarded special train and were taken to the residence of Mr. George Vanderbilt, now being erected on a mountain at Biltmore, about three miles from Asheville, returning to the latter place in time for lunch. The train left Asheville at 3 o'clock, arriving at New York about 12 o'clock noon Monday.

EXHIBITS.

Fairbanks, Morse & Co., Chicago, Barrett lifting jack. St. Louis Register Co., St. Louis, Mo., street car fare registers. John H. Stedman, Rochester, N. Y., exhibit of various forms of transfer tickets as used on 140 different street railroads.

Rochester Car Wheel Works, Rochester, N. Y., street car wheels from 20 in. to 36 in., and steam railroad car wheels, 24 in. and 36 in.

Central Electric Heating Co., New York City, electric car heating system.

Hartford Woven Wire Mattress Co., Hartford, Conn., Roberts' patent woven wire spring car seats.

Lewis & Fowler Mfg. Co., Brooklyn, N. Y., car jacks for lifting car bodies or truck and motor together; also the L. & F. street car fare register and stove.

Wadham's Oil & Grease Co., Milwaukee, Wis., curve and motor grease; oil and grease cups and general supplies in that line.

General Agency Co., New York, the "Dragon" and other headlights and signal lamps for both steam and street railroads.

Charles Munson Belting Co., Chicago, Ill., leather belts for use in electric railroad work.

A. Groetzinger & Sons, Allegheny, Pa., rawhide pinions and gears.

Cutter Electrical Mfg. Co., Philadelphia, Pa., "C. S." magnet circuit breaker.

Benedict & Burnham Mfg. Co., New York, N. Y., solid one-piece rail-bond; and feeder, trolley and magnet wire.

C. G. Smith, New York, street car lamps and headlights.

Craighead Engineering Co., Cincinnati, O., flexible pole brackets and general line of overhead trolley line material.

Safety Clutch Brake Co., Philadelphia, Pa., new electric coupled clutch street car brake.

R. D. Nuttall Co., Allegheny, Pa., gears, pinions, trolleys and bearings for electric railroads.

Standard Railway Supply Co., Chicago, Ill., "Standard" street car stove.

Keller Printing Co., New York, dating machine and samples of street railroad fare and transfer and ferry tickets.

Adams & Westlake, Chicago, Ill., "Acme" automatic car window shade and open street car curtains; Emery platform safety gate; "Bessemer" steel headlight; Pantasote leather goods.

Taylor Electric Truck Co., Troy, N. Y., Taylor improved electric car truck and "Empire State" radial truck; anti-heating Eureka metal bearing for steam and street railroads.

Levi Dederick, Albany, N. Y., "Dual" street car fender.

Lindburg, Sickel & Co., Trenton, N. J., "Trenton" trolley tower wagon.

Stillwell-Bierce & Smith-Vaile Co., Dayton, O., steam pumps; steam water heater and purifier; "Victor" water wheel; Worrall friction clutch; railroad track jacks.

National Lock Washer Co., Newark, N. J., lock washers for track, moto s, trucks and cars.

Leoniard Pneumatic Safety Car Fender Co., Baltimore, Md., model and full-sized pneumatic fender for street cars.

H. J. Wightman & Co., Scranton, Pa., system of block signals for trolley lines.

Fuel Economizer Co., Matteawan, N. Y., specimens of vertically cast economizer pipes.

Bushnell Mfg. Co., Easton, Pa., reversible tilting seat and spring seats and backs for electric, cable and horse cars.

Chas. L. Cornell, Hamilton, O., arc headlights for trolley cars; electric soldering irons.

American Railway Supply Co., New York, caps, badges, uniforms, buttons, etc.

H. Falk Mfg. Co., Milwaukee, Wis., Falk trolley head and rail joint.

A. Whitney & Sons, Philadelphia, Pa., pair of electric car and cellular tread wheels and wheels for cable and horse car service.

(Continued on page 744.)



ESTABLISHED IN APRIL 1856.
Published Every Friday.
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

In our monthly accident record, printed in this issue, we publish accounts of two fatal rear collisions due to failure of block-working. When we can report two such cases as these in a single month it must be apparent to every one that America is no longer exclusively wedded to the ancient time-interval system of running trains. But it is also apparent that our progress is not all in the right direction, and railroad managers will wish to know the precise causes of these collisions. In the Massachusetts case we shall probably have a report from the Railroad Commissioners, but in New Jersey there is not generally any public investigation or report that gives the details of such accidents satisfactorily. An obvious preventive of future collisions, in both these cases, would be to use a "controlled manual system"—that is, the principle of the Sykes lock; but those who think they cannot afford such a costly luxury as that, can find an equally obvious remedial measure by noting that in both these cases the fatal blunderers were inexperienced. One had worked but a short time and the other was only 19 years old. These facts are not conclusive evidence against the signalmen, warranting their conviction; but with the excellent record of the English roads before us they should be conclusive evidence to every railroad manager that long training of signalmen is a vital factor if one is to operate the simple "telegraph block" with success. How else can we account for the remarkable freedom from rear collisions on English roads? Those roads do not use the Sykes locks, but they do put their men through a long apprenticeship before entrusting them with grave responsibilities.

In discussing discipline, or, in the language of the programme the problem of "obtaining trained, reliable and loyal employees" the Railroad Superintendents' Society is fulfilling one of its most distinctive functions, and the last meeting, reported in the *Railroad Gazette* of Oct. 19, is therefore to be regarded as one of the best in the history of the society. The principal points in the discussion on this topic will bear repeating. "To get well-trained men, train them yourself." This answer to the first question was generally concurred in. What it means, of course, is not that some other road may not have instructed a man for you better than you can do it yourself, but that men coming from another road are very likely to have left that road for some cause which indicates some undesirable quality. This is so, even where the man has not been "dismissed for cause." The mere fact that a man is of a roving disposition must in general count against him. The "tramp brakeman" is the bane of the train service, and we cannot expect men to be very loyal to the railroad system of the United States, or to take more than an abstract interest in what to them is an abstraction. If they are to get a pride in the service it must be in the service of one company. This alone is a powerful reason for catching your men young and training them and promoting from your own ranks. Intelligent and trustworthy young men are now easily procured by any superintendent; every well managed road always has men in the lower ranks ready to promote, and new comers ought in general to begin in such lower ranks, whatever their antecedents. A road which is

subject to great fluctuations in its freight service may not be able always to stick to its principles in this matter, but the principle can be adhered to in spirit by taking great care, in hiring men who have been on other roads, to test their moral qualifications thoroughly. Indeed, a common trouble with such men is not that they have been badly trained elsewhere, but that they have learned by varied experience how to evade training. The statement that the seniority rule impairs good discipline probably meta response in many members' minds, if not, from their mouths. The difficulty was recognized as one hard to deal with; it is only a rude and often an unjust way of selecting men for promotion. The only help that we know of is that heretofore mentioned in *Railroad Gazette* preachers, to keep such a minute and thorough record of every man's service that you can justly and in some detail compare one man with another. Then when a promotion is challenged you will be prepared; and such a record discourages challengers. In a recent circular concerning neatness of appearance on passenger trains, one superintendent said "in selecting men for these places, fitness rather than length of service will be considered." Why is that not equally reasonable in regard to other qualifications?

As long as the members present did not feel like remaining in session two days it is just as well that the subject of signaling was handed over to the committee to be put in shape for the next meeting, and the report of the committee presented at this meeting will furnish a good basis for its work. This report, while advancing some ideas on which there are still pronounced differences of opinion, is in refreshing contrast to the great mass of essays on signalling, in that it is pronounced in favor of block signalling everywhere. As the chairman of the committee, Mr. Wattson, is on a road which has long used the manual block system in its most inexpensive form, this expression should have much weight. Men with devices to sell have always advocated block signalling, while—broadly speaking—railroad officers have always been afraid to do so, except with important reservations. Here we have an impartial and unprejudiced view.

The Air Brake Decisions.

In our issue of December 1, 1893, was published in full the decision of Judge Townsend in the United States Circuit Court in the suits of Westinghouse against the New York Air Brake Company. It will be remembered that Judge Townsend granted an injunction and accounting, which injunction has stood ever since.

Within a few days Judge Shipman of the United States Circuit Court of Appeals has rendered a decision affirming the decision of Judge Townsend in certain particulars and reversing it in others, but actually leaving the devices in suit just where the lower courts left them. We propose in what follows to set forth as clearly as possible certain questions that were raised in these suits, and the results so far as the two courts have gone. But the matter is complicated and a thorough understanding of it requires hard and close reading, and a good deal of such reading. Those who care for more particulars than can be found in this article will do well to look to Judge Townsend's decision as published in our issue of December 1, 1893, or as readily obtainable in pamphlet form; and also at Judge Shipman's decision which appears in full in another part of this issue of the *Railroad Gazette*.

There were three bills in equity for infringement of certain patents; namely:

Bill No. 4,977, infringement of patent No. 376,837, quick action triple valve Westinghouse, January 24, 1888; and patent No. 172,064, detail of triple valve construction Westinghouse, February 11, 1876. On claims 1, 2 and 3 under patent 376,837 Judge Townsend granted an injunction and accounting. Claim No. 6 was dismissed. The findings of the lower court are sustained entirely by Judge Shipman. The claim of infringement of patent 172,064 was dismissed by Judge Townsend and Judge Shipman sustained the finding.

Bill No. 4,976, patent No. 393,784, emergency valve construction, granted to H. S. Park, December 4, 1888, dismissed by Judge Townsend, decision affirmed by Judge Shipman.

Under the same bill, patent No. 222,803, engineer's valve, granted to Westinghouse, December 23, 1879, injunction and accounting order by Judge Townsend, affirmed by Judge Shipman.

Bill No. 5,315, patent No. 448,827, emergency valve construction, granted March 24, 1891, to Westinghouse; injunction and accounting ordered by Judge Townsend, reversed by Judge Shipman.

By all odds the most important claim in all three of the bills was that of infringement of patent No. 376,837. This patent was the result of the improvements

to which the Westinghouse led by the Burlington brake trials in 1887. The complaint was of infringement of claims 1, 2, 3 and 6 of this patent. Claims 1, 2 and 3 are as follows:

I. In a brake mechanism, the combination of a chamber or casing, having direct connections to a brake-cylinder and to a brake-pipe, respectively, a valve controlling communication between said connections, and a piston or diaphragm which is independent of and unconnected with a triple-valve piston, and is actuated by pressure from an auxiliary reservoir in direction to impart opening movement to said valve, substantially as set forth.

II. The second claim includes a check or non-return valve controlling communication between said valve and the brake-pipe passage of the chamber, substantially as set forth.

III. In a brake mechanism, the combination, with a triple valve, of a supplemental chamber or casing having passages leading to a brake cylinder and to a brake pipe, respectively, a supplemental valve controlling communication between said passages, a supplemental piston operating independently of the triple-valve piston and adapted to impart opening movement to said supplemental valve, and a passage establishing communication between said supplemental piston and an auxiliary reservoir, substantially as set forth.

These cover the essential elements of the quick acting feature of the triple valve; that is, the supplemental piston, the supplemental valve chamber and a piston or diaphragm independent of and unconnected with the triple valve piston.

The defendants were sued on two triple valves, each of which the complainants claim to be an infringement, namely, the quick action triple valve, and the modified quick action triple valve. The defense was that their emergency apparatus, as well as that of the Westinghouse device, is merely a combination of inventions described in earlier patents. Judge Townsend decided that Westinghouse in the mechanism described in patent No. 376,837 "invented and created a new device adapted to new conditions and developed in new combinations which produced new and different results. . . . The radical difference between this patent (the earlier patent) and the patent in suit consists in the difference of construction and operation involved in the addition to the latter of the separate emergency apparatus." And finally the Judge says "as patent No. 376,837 accomplished this result [the quick action, namely] by the use of a separate piston, and as the defendants' apparatus has accomplished this result also by the use of one or two separate pistons they must be held to have infringed the first and third claims of said patent."

Judge Townsend, in the lower court, discusses the case in a most able way, but we will not add to the length of this article by quoting any of the discussion, merely pointing out in passing that the judge does not try to decide the application to the case of the doctrine of pioneer ship, but disposes of it by a consideration of the prior art and a comparison of the defendant's devices with the patent in suit independently of that doctrine. This is an important point to bear in mind for here the two courts differ, although they arrive at the same end, viz.: That both forms of the defendants' quick action triple valve infringe. The first infringes claims 1, 2 and 3 and the second infringes claims 1 and 3.

Judge Shipman in sustaining the decisions says: "The patentee was a pioneer in that he designed, in No. 376,837, a new way to accomplish a desired result, but upon the same general idea which he had unsuccessfully tried to work out in the earlier patent. His later patent was the bridge, and not a mere step, which carried railroad car builders from failure to success. It is not important now to determine the grade of its pioneer ship and whether it may be classed in the list of those inventions which are of the highest rank; but it was an invention created to achieve great necessities and overcome great hindrances, and was one of wide breadth. A court would not be justified in adopting 'a narrow or astute construction' which should minimize the character of the invention, leave its real scope open to trespassers and thus be fatal to the grant.' The claims of the patent do not contract the grant to narrower limits than those which the invention, as made by the patentee, actually covered, and the claims therefore are not limited to the precise mechanical means described in the specification, by which the supplementary piston is actuated. They compel it to be disconnected with and to be independent of a triple valve piston, and to be actuated by pressure from an auxiliary reservoir by some means equivalent to the means which are described in the specification. The operative features of the invention which are described in the three claims are the same, whether auxiliary pressure is permitted to exert itself continuously or intermittently when a port is opened."

The sixth claim of patent No. 376,837 is for a combination of the triple valve casing and the supplemental valve chamber; the latter composed of an inner section integral with the casing and of a separate outer section, etc. It is claimed that the construction of the apparatus was simplified. Judge Townsend denies the infringement on the ground of lack

of invention. This, it will be seen, is a very minor point in the suits.

Patent No. 172,064 was issued to Westinghouse in 1876 as an improvement on an earlier patent. It is for a detail which was important in the early and simpler form of the automatic brake valve, but which has ceased to be important in the forms now in suit. The claim of infringement of this patent was dismissed in the lower court and that decision is affirmed by Judge Shipman. This disposes of all of the claims under bill No. 4,977.

We will now take up bill No. 4,976. In this it is claimed that the defendants in their first form of quick action triple valve infringed claims 1 and 2 of patent No. 393,784 granted to Harvey S. Park, December 4, 1888, and assigned to the Westinghouse Company. The essence of this invention is the combination of elements for operating the separate emergency valve by train pipe pressure instead of by auxiliary reservoir pressure, as in patent No. 376,837. This was accomplished by providing a separate emergency piston and valve ordinarily exposed to train pipe pressure above the piston, which pressure served to hold the valve on its seat and was not affected by ordinary reductions of pressure in the train pipe. But a reduction necessary for an emergency stop was to be vented into the space below the piston equalizing the pressure on both sides and acting on the under side of the valve, causing it to be unseated and thus allow the train pipe pressure to be vented directly into the brake cylinder.

We repeat, in order that it should not be forgotten, that the essence of this invention is the operation of the emergency valve by train pipe pressure instead of by auxiliary reservoir pressure. Infringement of this patent was denied by Judge Townsend on the ground that the defendants' emergency valve, in their quick action triple valve, is not operated solely by train pipe pressure, but by combined spring, train pipe, brake cylinder and auxiliary reservoir pressure. Judge Shipman, in the Court of Appeals, has confirmed the decision of Judge Townsend regarding this patent.

The other claim under case No. 4,976 is for infringement of the patent on the engineer's valve. On this Judge Townsend granted an injunction and accounting and Judge Shipman confirms the decree of the Circuit Court.

We are now left with case No. 5,315. In this suit the claim is made of infringement of patent No. 448,827. The claims which are alleged to have been infringed are:

1. In a fluid-pressure brake apparatus normally operated by a triple-valve device, the combination, with such an apparatus, of a valvular appliance having a casing provided with supply and discharge passages or connections, and a valve controlling an exhaust port from the supply passage to the discharge passage for quickly releasing pressure in the supply passage, said valve being actuated to open the exhaust port by a greater than normal reduction of pressure in the supply passage independently of the action of the triple-valve device substantially as set forth.

2. The combination, with a triple-valve mechanism of a discharge valve controlling an exhaust port from a supply passage to a discharge passage for quickly releasing the pressure in the supply passage, said valve being actuated to open the exhaust port by fluid pressure in an auxiliary reservoir on reduction of pressure in the supply passage below the normal degree, in whatever position the slide valve of the triple valve mechanism may be brought by such reduction, substantially as set forth.

The distinct invention of this patent is the combination of the emergency valve with the triple valve mechanism under such relations that no movement of the triple valve mechanism is needed to operate the emergency valve. The defendants admitted infringement of the claims of this patent, but denied their validity. Judge Townsend held that the patent covers a useful invention and that the claims are valid, and accordingly rendered a decree for an injunction and accounting under this suit. This is the one decision of the lower court that has been reversed by the upper court. All of the others stand precisely as they went up to the Court of Appeals.

Judge Shipman's point is that the theory of the complainants omits an important characteristic of novelty of patent No. 376,837 which is the independency and disconnection of the supplemental piston from the triple valve piston. He holds that the form covered by patent 448,827 is included in the generic claims of No. 376,837, and no invention could consist in the mere elimination of the action of the triple valve piston as an element of control. The patentee in the former patent exhausted his power to obtain additional patents for mere modifications, having obtained the broad claims. In fact, the Judge says that this later patent was simply a form of the invention of patent No. 376,837 and covered by it. This is the ground on which he reverses the decision of the lower court, and it seems to strengthen rather than to weaken the Westinghouse position as it makes patent No. 376,837 so much the broader.

We may sum up, then, by saying that out of the five cases brought by the Westinghouse Company originally three were won and two were dismissed in the lower court. There has been one reversal in the upper court. But the number of points of the least possible consequence; the important fact is the weight of the

points decided. We find that the decision of the Court of Appeals sustained the decrees of the lower court against both forms of triple valve which were sued upon and against the engineer's valve. So far as concerns the actual appliances brought into court the matter stands just as the lower court left it. As for the effects of the decision upon the future we will not speculate. We may say, however, as an interesting fact, that the New York Air Brake Company has made still another form of triple valve, more recent than those sued upon in the cases which we have analyzed above, and that suit has been brought by the Westinghouse Company for infringement of other patents by this latest triple valve.

Long Valve Travel and the "Miller."

In writing, August 17, on the effect of valve travel on the efficiency of locomotives we brought up the instance of an engine built some years ago for the New York, Providence & Boston. The Master Mechanic who has had most to do with engine does not agree with all that was said then, and letters from him appear on the first page of this issue.

The engine "J. W. Miller" was originally an 18x24-inch, eight-wheeler with six-foot wheels and with 83,400 pounds on drivers, 180 pounds steam pressure, and was required to make a run of 62½ miles in 62½ minutes with a heavy eight-car train, and to make one stop between Groton Ferry and Providence, R. I. The service required could only be performed by giving to the engine a very large mean effective pressure in the cylinders, and to provide this, it is understood that the builders put in special valve dimensions, viz: 2 inch ports, 2 inch outside lap, and 7½ inch valve travel, the ports being of the common length of 18 inches. Mr. Butler says: "She was never run in the guaranteed service, because there has never been a train scheduled on this road requiring such performance, or anywhere near it." The engine, then, was never run in the service for which she was intended, and that settles one of the points in question.

Originally the engine was an eight-wheeler with a special valve gear designed to give great cylinder power at high speed. At the time we called the engine a "mongrel" she was a ten-wheeler, having a rear truck, ordinary valves and the common dimensions of steam ports, such as would be used in slow service for passenger freight locomotives. Here was an engine not like any other that we know of in passenger or freight service; there were a novel form of rear truck, abnormal sizes of steam chest, steam pipes and passages, unusual throw of eccentrics, false valve seats, etc., which made it different from any type of engine built before or since, so far as we know, and there is no technical word to describe such an engine, hence we called it "mongrel."

The steam chest valves were not large in over all dimensions compared with valves now built, as the ports were but 18x2 inches, while compound locomotives, and some simple engines, have 23 and 24-inch ports from 1½ to 2 inches wide. If the valves were too heavy, they must have been made too thick. It was not necessary for any reasons that appear on the surface to have reduced the length of the ports or the width, in order to get a lighter valve, and a change in the outside lap reducing it to 1½ or 1¾ inches, would have removed any difficulty that was found in starting the engine quickly. It then appears that neither the outside lap, the travel nor the weight of the valves were such as to demand the reduction that was made of the port openings at high speed.

We were wrongly informed about the "Miller" having been put into freight service, and Mr. Butler shows that it has only been used in passenger service; however, whether in passenger or freight service does not matter particularly; the point in question is whether the "Miller" after having been changed to a ten-wheeler with a rear truck, and given valve gear of ordinary capacity, was a good freight engine or a good passenger engine. This is perhaps a matter of opinion; we said she was not a good engine for either service and this must be taken as including construction and repairs as well as performance. No doubt the performance of the engine in the ordinary passenger service has been good and this has not been disputed.

In complicated mechanism it very frequently happens that the entire characteristic of the machine and the measure of its fitness for a given service depends upon some small detail, and a change in this minor part may unfit the mechanism for a given service. So it is with locomotives in the fastest service. What might be considered a small change in valve dimensions is often a vital matter, and may often quite unfit the engine for the work required. In a compound locomotive for instance, the difference between a valve motion for freight service and one for passenger service, lies fre-

quently in about two pounds of cast iron which is used in the slower service for inside lap. The simple operation of chipping out with a chisel this small amount of material makes a vital difference in the performance of the engine and adapts her to run at a higher speed. Now, strictly speaking, the characteristic features of the original engine, "Miller," with the valves designed for unusually fast and heavy work, were essentially changed when they were altered to be such as are used for slow passenger and freight engines. Apparently it has become necessary in talking about this engine to designate a definite period in her evolution or there is bound to be a conflict of opinion.

Now we have said that the changes in the "Miller," that is in the valve motion, (see *Railroad Gazette* August 17, page 566), were made to satisfy a local master mechanic. Mr. Butler was master mechanic at that time and his office is located not far from the works that built the engine. Mr. Butler says that the alterations were made by the railroad company and the changes were made because "something had to be done to put her in condition for service required. I proceeded to change the parts that were clearly at fault. I put in false valve seats, etc., etc." It is hardly to be supposed that the builders would confess their inability to construct a suitable valve to run with 7½ inch travel and 2 inch ports, and considering this it would appear that the Master Mechanic changed the valve motion to satisfy himself or at least accord with his own convictions as to the best condition into which the engine could be put.

The only value of a discussion of this kind about an engine which has, strictly speaking, long since disappeared, is to emphasize the necessity, in these days of fast, heavy service, for designing the valve motion of locomotives to suit the condition of the service to be performed. The increase of train loads and speed has given a wide variation in conditions, and as a consequence there will be found in well designed locomotives great differences in the port openings required to permit the free admission and escape of steam.

When the engine was called a "mongrel," reference was made to that stage of her evolution when she had the rear truck and some other unusual features, but it happened that she was at that moment being made over into a pretty good-looking eight-wheel engine, with a different boiler and some other changes about which we do not know the details, and this has led to a misunderstanding. We have no hesitation now in believing that the "Miller" has become a handsome, six-foot driver, express locomotive of the eight-wheel type, fairly adapted for ordinary heavy service; but in so far as the essential features of construction are concerned, she is no longer the original engine "Miller," even in name, being now No. 340. An Irishman had his ancestor's flint-lock which he prized as having seen service in 1776 and he says "she's as new as ever with her government lock and rifled barrel and the stock I made myself."

Prussian State Railroads.

At the close of the fiscal year 1892-93 (which ends with March), the Prussian State railroads included 15,812 miles of standard-gage Railroad (243 miles more than the year before), 62 miles of narrow-gage railroads serving as common carriers, and 124 miles of lines not used for public traffic. No less than 1,118 miles of the system are outside of Prussia.

The capital invested in this system was \$1,598,636,528, and for the standard-gage lines open to public traffic amounted to \$100,961 per mile of road.

The gross earnings in 1892-93 were \$221,027,815, which is one-tenth of 1 per cent. more than the year before. Per mile of road they fell from \$14,177 to \$13,984. The unpaid services rendered to the Imperial Post Office Department, which conducts what is equivalent to a very large express business (parcels weighing not more than 11 pounds being carried all over the Empire for a trifling sum), if paid for would have added \$5,718,460 to the gross and also to the net earnings.

The working expenses were reduced 3½ per cent. from the previous year to \$8,707 per mile of road. The chief reductions were in cost of renewals and in "improvements." The expenses were 63.09 per cent. of the earnings, against 65.44 per cent. the year before. The net earnings increased 6.9 per cent., and were at the rate of 5.15 per cent. on the cost of the property, against 4.91 per cent. the previous year.

Of the total earnings, 25.5 per cent. was from passengers, and 68.7 per cent. from freight. The passenger traffic was equivalent to a daily movement each way over the entire system of 441 persons. There were 10.8 journeys and 163 miles of travel on the average for every inhabitant of Prussia. Of the total passenger earnings 4.1 per cent. was from first-class, 25.2 from second-class, 41 per cent. from third-class, 28.9 per cent. from fourth-class, and 2.8 from military passengers. The total sleeping-car earnings were \$122,831.

The number of regular permanent employees of the

system was 107,045; of laborers, 175,578. There was a decrease of 16,489 (8 per cent.) in the number of laborers, and an increase of 6,126 (6 per cent.) in the permanent staff. The hard times had evidently compelled a reduction of the force.

The State railroads pay an income tax to the local towns (commune) governments, which amounted to \$1,053,795 in the year in question. The other taxes were less than \$150,000.

In spite of the economy practiced, an increase of 87 locomotives, 371 passenger cars, 42 baggage cars, and 1,742 freight cars was provided for out of current earnings during the year, and the whole equipment at its close consisted of 10,564 locomotives, 17,037 passenger cars, 4,639 baggage cars, and 207,392 freight cars.

September Accidents.

Our record of train accidents in September, given in this number, includes 47 collisions, 91 derailments and 8 other accidents, a total of 146 accidents, in which 50 persons were killed and 126 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

	Butting	Crossing		Total
COLLISIONS:	Rear.	ting.	and other.	
Trains breaking in two.....	6	0	1	7
Misplaced switch.....	1	1	0	2
Failure to give or observe signal.....	6	0	0	6
Mistake in giving or understanding orders.....	0	3	0	3
Miscellaneous.....	5	3	7	15
Unexplained.....	4	6	4	14
Total.....	22	13	12	47

DERAILMENTS:	3	Track	repairs.....	1
Broken rail.....	7	Open	draw.....	1
Loose or spread rail.....	1	Bad	switching.....	3
Defective bridge.....	3	Animals	on track.....	5
Defective switch.....	1	Landslide.....	1	1
Bad track.....	4	Tornado.....	1	1
Broken wheel.....	6	Maliciously	misplaced	switch.....
Broken axle.....	1	switch.....	2	2
Broken car.....	1	Malicious	obstruction.....	2
Fallen breakbeam.....	1	Accidental	obstruction.....	3
Fallen deadwood.....	1	Unexplained.....	36	36
Failure of coupling.....	4	Total.....	91	91
Misplaced switch.....	2			
Careless running.....	2			

OTHER ACCIDENTS:	2	Boiler	explosion.....	2
Broken side rod.....	2	Broken	side rod.....	2
Cars burned while running.....	1	Cars	burned while	running.....
Other causes.....	3	—	8	—

Total number of accidents..... 146

A general classification shows:

	Col-	Derail-	Other	Total	p.c.
Defects of road.....	0	15	0	15	11
Defects of equipment.....	8	14	4	26	19
Negligence in operating.....	25	11	0	36	25
Unforeseen obstructions and malice.....	9	15	4	19	12
Unexplained.....	14	36	0	50	33
Total.....	47	91	8	146	100

The number of trains involved is as follows:

	Col-	Derail-	Other	Total
Passenger.....	24	32	5	61
Freight and other.....	60	65	3	128
Total.....	84	97	8	189

The casualties may be divided as follows:

	Col-	Derail-	Other	Total
KILLED:	10	19	1	30
Employees.....	2	3	0	5
Passengers.....	4	11	0	15
Others.....	—	—	—	—
Total.....	16	33	1	50

	INJURED:	Employees.....	Passengers.....	Others.....	Total.....
Employees.....	40	38	6	84	84
Passengers.....	12	20	0	32	32
Others.....	0	10	0	10	10
Total.....	52	68	6	126	126

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass.	Pass.	Emp.	Emp.
Killed.	1	3	2	6
Defects of road.....	0	0	3	6
Defects of equipment.....	2	15	12	44
Negligence in operating.....	8	6	6	10
Unforeseen obstructions and malice.....	2	10	6	14
Unexplained.....	0	4	7	14
Total.....	5	32	30	84

Thirty-six accidents caused the death of one or more persons each, and 30 caused injury but not death, leaving 80 (55 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with September of the previous five years shows:

	1894.	1893.	1892.	1891.	1890.	1889.
Collisions.....	47	77	103	159	124	71
Derailments.....	91	75	84	92	120	59
Other accidents.....	8	6	6	10	2	2
Total.....	146	158	203	237	254	132
Employees killed.....	30	52	68	54	73	26
Employees injured.....	20	47	25	11	54	20
Others injured.....	84	101	110	95	164	77
Passenger trains involved	61	59	74	75	87	51

Average per day:

Accidents..... 4.87 5.26 6.77 7.90 8.47 4.40

Killed..... 1.67 2.63 3.10 2.16 4.23 1.53

Injured..... 4.20 6.67 7.83 6.60 11.26 5.40

Average per accident:

Killed..... 0.342 0.500 0.458 0.52 0.500 0.248

Injured..... 0.863 1.266 1.157 0.770 1.330 1.227

Of the five deaths of passengers in September two are charged to the wreck caused by a tornado at Charleston, Mo., on the 12th. Another calamity from a similarly unforeseen cause was that at Hinckley, Minn., on the 1st. We have no record of passengers killed or injured on the cars in this case, although a number were burned or suffocated after they disembarked. Two passengers were

killed at Camden, N. J., on the 2d in a rear collision due to a failure of block working. Another conspicuous failure of block working, killing two trainmen, was that in the Hoosac Tunnel on Sept 8. This case seems to have been due to carelessness of the operator at the entrance to the tunnel who had a visitor in the tower with him at the time he disregarded the rules. He is only nineteen years old. He has been held in heavy bonds for trial.

Among the notable accidents of the month were those at Lafayette, Ind., on the 29th, and at Columbus, O., on the 4th. Again we have to report two serious oil explosions. One of these explosions occurred several hours after the derailment and injured a dozen or more passengers, but as these persons seem to have been only bystanders at the time we have not counted them as passengers or their injuries as caused by the train accident. The number of "others" killed is again large. A peculiarly distressing case was that near Woodstock, Ill., on the 30th, where several boys riding in a car of lumber were killed.

Near Middlesborough, Ky., on the 19th, the engineer of a locomotive, who was oiling his engine while he passed over a trestle, was thrown off his balance "by a sudden lurch of the engine," and fell to the ground 106 feet below. An engine of the Old Colony, which ran through an open draw at South Boston on the 12th, was lifted bodily by means of a floating derrick and no damage was done to the draw nor were trains delayed either by the accident or by the work of recovering the engine.

On the 18th a hand car on which a gang of bridge builders were riding, on the Chicago & Northwestern, ran over an explosive near Elva, Ill. Seven of the men were injured, three fatally. On the second six persons were injured by a collision of electric street cars near Rittersville, Pa., and similar accidents occurred in Philadelphia on the 19th, and near Columbia, Pa., on the 28th. In the latter one man was killed. At Fitchburg, Mass., on the 18th, a street car ran into a locomotive of the Fitchburg railroad, and at Jeanesville, Pa., on the 24th, one ran into a Lehigh Valley passenger train. In the former case the "trolley was off" and in the latter the motorman seemed to have assumed that when no regular train was due the crossing would be clear. Three persons were killed in a wagon at a crossing near London, Ohio, on the 21st, and the same number at Putnam, N. Y., on the 11th.

Annual Reports.

Western New York & Pennsylvania.—This report is for the year ending June 30, 1894. The results of operations are given below.

	1894.	1893.	percent.
Miles operated.....	643	669	...
Passenger earnings.....	\$691,802	\$772,167	10.4
Freight earnings.....	2,162,694	2,798,916	19.1
Mail, express, etc.....	157,406	145,556	...
Total.....	3,011,902	3,716,639	18.96
Expenses.....	2,214,355	2,517,126	12.0

Net earnings..... 797,547 1,199,513 33.51

Percentage operating expenses..... 73.52 67.72

year, covers 1,850 miles, the same as last year. The principal results of operation are as below:

Earnings:	1894.	1893.	Decrease, per cent.
Passenger.....	\$4,104,769	\$4,307,371	4.6
Freight.....	7,866,967	9,338,787	15.7
Mail and express.....	803,078	769,993	...
Total.....	\$12,774,814	\$14,416,151	11.1
Expenses and taxes.....	9,750,503	10,964,789	11
Percentage of op. expenses.....	76.32	76.05	...

In the year a 5 per cent. dividend was paid on preferred stock only, amounting to \$500,000. In each of the three previous years a dividend of 3 per cent. had been paid on common stock as well as 5 on the preferred. Of course the decrease in earnings is due to the old causes with which we are so familiar, and which operated with peculiar intensity in the territory covered by this system.

The number of passengers carried was 5,355,528, being 11 per cent. less than in the preceding year. The passenger miles, however, were over 218 millions and were 12 per cent. more than in 1893. The rate per passenger mile was 1.882 cents; the preceding year it had been 2.187. Obviously the length of the journey increased, while the number of passengers decreased and the rate fell off. The President attaches comparatively little importance to the World's Fair passenger earnings.

The tons of freight were 7,803,300, and the ton miles somewhat over 1,211 million. The rate per ton per mile was 0.649 cents, and the year before 0.701. While the tons carried fell off 13 per cent., the ton miles declined 9, and again we see the influence of the depression of local industries and the decline of local traffic.

During the year, \$5,000,000 of consolidated bonds were sold, the proceeds being applied to the reduction of the floating debt and to improvements which were under way at the beginning of the year. Of course the decrease in earnings is due to the old causes with which we are so familiar, and which operated with peculiar intensity in the territory covered by this system.

Since the formation of the present company in 1889, over \$696,000 has been spent in renewals of rails, the difference in cost of renewing due to the increased weight of rails having been charged to operating expenses. In the same time the company has spent nearly \$168,000 for interlocking plants at crossings, and has spent \$1,287,000 for bridges and trestles, and \$679,000 on buildings and stations, all of which has been charged to operating expenses.

Moreover, about \$1

not fair to expect him to stand up to be shot at. If he does so it is to his credit, but he is doing something more than his simple duty. Furthermore, the railroad companies have no right to expose the lives of their passengers by engaging in war with highwaymen. General shooting from the train is pretty sure to bring general shooting at the train; and as the train robbing business advances towards a fine art there is more and more disposition on the part of the robbers to confine their fire to the express car, and it is coming to be the rule that passengers may sleep unmolested. There is only one way for a civilized country to treat this business, and that is for the officers of the law to stop it, which they can do perfectly well. The whole thing is the outgrowth of a gross indifference to the rights of the railroad companies, and of those who travel and ship treasure by rail. We are glad to find the following in a recent issue of the *Evening Post* (New York). It is another way of saying what we have often said:

"No one would be particularly surprised to read any day in the newspapers of a 'hold up' between New York and Albany. Robbers can hide as easily in New York City as in the sage-brush country beyond the Rocky Mountains, perhaps more so. Something must be done to deliver society from this pest. One thing is certain. There must be better enforcement of law all around. The form of disease called Coxeyism, which had such a run last spring, and which took the form of seizing railroad trains and levying contributions on towns through which the 'commonwealers' passed, was almost certain to develop into train robbery if allowed to pass unchecked. If the states through which they passed had enforced the vagrant laws against them and put them to work at Coxey's favorite enterprise of making good roads, the number of train robbers would now be smaller than it is."

A Denver paper reports that Judge Hallett, of the United States District Court for Colorado, recently directed Receiver Trumbull, of the Union Pacific, Denver & Gulf to recognize no assignments of wages due employees, but to pay all such moneys to the persons in whose name the wages are entered on the pay roll. This was done, because it was said, of the expense and annoyance caused in the Receiver's office by the presentation of claims under such assignments. This will be a pleasing item of news to many superintendents and paymasters, for the expense and annoyance referred to constitute a perpetual burden on many railroads outside of Colorado. Every one who desires to freeze out this class of assignees will be glad of aid and comfort from such a powerful source. At first sight the Judge's action seems harsh, for it will deprive some railroad employees of the privilege of borrowing money when they are in distress. But it is likely that the rules of the company, well known to the employees, forbid assignments of wages, and that, therefore, the order of the court is not in the nature of instructions to the Receiver but rather of a little bracing up in the performance of an unpleasant duty. Where an employee thus has fair warning, the right of the manager is pretty plain and the main thing for him to look out for is not to do injustice to deserving employees in real distress. If he is harsh or careless in this direction he will find public sympathy with the employees and they will easily get magistrates to entertain proceedings against the road.

It has long been known that net earnings, which declined seriously in the spring and early summer months, gained to an important extent in August. The *Financial Chronicle* published last week its statement of net earnings covering 137 roads for the month and 127 for the year from Jan. 1 to Aug. 31. In the month of August the gain in net earnings as compared with August of the year preceding, was 7.63 per cent., the gain in gross having been less than 1 per cent. For the eight months of the year the loss in net was 14 per cent., and this was compared with a bad year, the loss in the first eight months of 1893 having been about 3 per cent. In fact the gain in net earnings for the month this year is in comparison with a slim month of 1893, the loss for the month last year having been 17 per cent. Out of the whole number of 137 roads reported for the month, 89 showed gains in gross earnings and 97 in net. The increase in net earnings is greatest on the Pennsylvania system, which amounts to no less than \$773,748. The Burlington follows with an increase of \$206,000 and the St. Paul with \$185,000. The greatest loss in net for the month is on the Atchison, which loses \$377,000. The Illinois Central loses \$204,000, which of course was to have been expected as the comparisons are with a season of immense business for that road.

NEW PUBLICATIONS.

The Boiler Maker.—This is a little monthly journal, published by Joseph T. Ryerson & Son, builders of boilers in Chicago. It gives tables of useful information and a list of the sizes of sheets, tubes, etc., which can be obtained at once in stock in Chicago. There are personal and trade notes and communications relating to boilers and inspection. In the October number there is some discussion about the Master Mechanics' standard specification for locomotive boiler steel. Regarding the minority report, which was in favor of low tensile strength, soft steel for fire boxes, *The Boiler Maker* says:

"To us this seems arguing along the right line. We are not having difficulty at present, as far as cases come under our observation, so much from the failure of the strength of the sheet as from brittleness, largely due to an effort on the part of the manufacturers to keep up the tensile strength. We note in specifications made to-day by the best engineers and boiler makers, a demand for a

much lower tensile strength than was customarily called for a few years ago, and the consensus of opinion seems to be that what is more to be carefully watched than anything else is the relative percentages of the impurities in the chemical composition. . . . It seems that in connection with all the discussion in regard to the physical and chemical requirements, that the question of the *process* of manufacture was not sufficiently dwelt upon, and this brings us to the question raised in the August issue of *The Boiler Maker*, namely, the apparent necessity for two distinct sets of requirements. One specification should be for steel made by the open hearth, and the other for that made by the Bessemer process, until such time as a general verdict can be reached as to the comparative worth of material made by the two processes. We cannot emphasize this matter too much. . . . We are certainly at sea at present, for how many apparently perfect fire-box boiler specifications we see, for which the engineer wishes the best in the market, filled with plate he would not use for a storage tank. Apropos to this subject, we note that the city of Chicago has adopted the following specifications for the boiler steel to be used in its boilers."

The specification for shells, domes, heads and drums requires the following: The ultimate tensile strength shall not be less than 55,000 nor more than 62,000 lbs. per square inch. All steel must stand hot or cold bending, double and hammered down on itself without showing signs of distress, and must be capable of withstanding the usual punching and drifting tests. Plates will be rejected if they contain more than .04 of one per cent. of phosphorus or more than .03 of one per cent. of sulphur. It will be remembered that the Master Mechanics' standard specification contains no chemical requirements for shell steel and no punching or drifting tests.

Recollections of a Civil Engineer.—Experiences in New York, Iowa, Nebraska, Dakota, Illinois, Missouri, Minnesota and Colorado. By D. H. Ainsworth. Newton, Ia.: 1893. 5 in. x 7 1/2 in., 177 pages.

As the sub-title of this book leads one to suppose, Mr. Ainsworth's experience has been chiefly in the West; in fact in what has from time to time been known as the Far West; and a rather unusual skill as a locating engineer has kept him for much of the time in front of the grading camps that have been such an important factor in the development of our country. The book contains a good deal of historical matter relating to the surveying and constructing of many railroad lines, with interesting notes bearing on the development of the country. Unfortunately, Mr. Ainsworth's literary style is not very good. If he had said more and selected and arranged his material more carefully, his book would have had far greater interest and value. For instance, Mr. Ainsworth made nearly all the surveys for the revision of grades out of Omaha for the Union Pacific. No man could tell the story of that long fight better than he, or better point out the meaning and effects of the connection of "the Boston party" with the road, and the letting of the "Hoxie," "Ames" and "Davis" contracts for the construction of the Union Pacific. That one of the main streams of continental travel was turned from the best and shortest channel by speculators in frontier town lots is made apparent, but the delay of about a year and the consequent breaking down of sound financial plans for building the road, with the subsequent, if not consequent, spoliation of the company, are not mentioned. It would have done us all good to read of the consulting engineer's (Silas Seymour's) almost speechless indignation when the Acting Chief Engineer presented a report in which a line was urged on the strength of average grades. But with all its defects the little book gives a good deal of history of public works, going back to 1850, much of which is not to be found outside of the covers of "Recollections."

Second Annual Report of the Bureau of Engineering of the City of Buffalo, New York, for 1893. We receive this report through the Chief Engineer, Mr. S. J. Fields, a little late to be sure, but still useful. It consists entirely of a statement of municipal work done or to be done; and this work, as a result of the very rapid growth of Buffalo in recent years and of the great anticipations of future growth, consists very largely of extensions and improvements of streets, sewers and sidewalks. Probably to the engineer the principal interest in the report is in the table of streets paved and to be paved. Here we find that in 1893 there were about 26 1/2 miles paved with asphalt at a cost of \$1,580,000; with brick 1.86 miles were paved, and with stone 0.58. For 1894 contracts had been let for 12.77 miles of asphalt and almost nothing else. Twenty miles more was in preparation; that is, the preliminaries were made for getting bids. Buffalo is today a great place to study the use of asphalt pavement.

The Trackman's Helper. A Book of Instructions for Track Foremen. By J. Kindelan, Roadmaster, Chicago, Milwaukee & St. Paul Railway. Third edition, revised and enlarged. Chicago: The Roadmaster & Foreman, 1894; 280 pages, 12mo.

The second edition of Mr. Kindelan's little book was published in 1891, and we are glad to see that it has reached a third edition, for that very fact is an evidence of the spread of intelligence, and of the desire to do really good work among section foremen and trackmen in general. The book is written by a practical trackman, and is very simple and unpretending in its style and thoroughly sound in its substance. We are glad to see, too, that Mr. Kindelan has a proper notion of the uses of engineers in track work, and has only a moderate amount of faith in that mysterious organ, "the old trackman's eye."

A List of Commercial Organizations, National, State and

Local, has been put in print by the Interstate Commerce Commission and copies may be had free from Secretary Edward A. Moseley, Washington, D. C. This pamphlet is a careful compilation of the names of the Boards of Trade and similar organizations throughout the United States, with the names of the Presidents and Secretaries. It must prove of value to many investigators and statisticians. It will be revised and republished as often as may be necessary.

The Street Railroad Journal has issued a handsome souveni number in connection with the thirteenth annual convention of the American Street Railway Association, held in Atlanta, Ga., October 17, 18 and 19. The book contains 122 pages of text principally descriptive of Atlanta, Chattanooga and other large southern cities, well illustrated by photographic reproductions and printed on heavy wood cut paper. The whole is a fine specimen of trade journalism.

TRADE CATALOGUES

Reference Catalogue of Interlocking and Signaling Apparatus. The National Switch & Signal Co., Easton, Pa. The handsome catalogue just issued by the National Co., gives detail plans, illustrations and a descriptive list of the apparatus manufactured by that company. A frontispiece shows the new works of the company at Easton, Pa. A half tone plate shows the standard interlocking machine; then follow numerous plates, printed in white lines with blue background to imitate blueprints, showing a great many details of apparatus, as for instance, a 4-lever section of the machine, shown in cross section, and front elevation and an elevation showing special locking of four levers. Among the specialties shown, aside from the machine itself, are the National anti-friction pipe carrier (Evans patent), an improved bracket and rail clip for detector bars, an improved arrangement of double slips and movable point frogs with hexagonal, adjustable, rocking shafts, and selectors and switch and lock movement. The catalogue also shows the National torpedo signal (Palmer), the double wire compensator (Mitchell & Stevens), the National electric slot and the Lattig automatic electric semaphore.

The company in arranging this catalogue has adopted for numbering its parts and for the catalogue lists a modification of the Dewey system of decimal classification, in which whole numbers designate the class to which the articles belong, and the decimals designate each individual part. For instance, the interlocking machines are designated by a series of numbers from 10 to 13, ground apparatus from 20 to 29, signals and fittings from 30 to 39, and so on. We find in the lists that 10.01 is a leg of an interlocking machine, 10.11 is a 4-way, 36-bar locking frame with caps, 10.50 is a plain dog, and 10.57 is a double dog; all of which might be confusing to the uninitiated reader, but is very clear and simple to the man who knows what he is looking for.

Coal Handling in Power Stations. The C. W. Hunt Co., 45 Broadway, New York.

In the great variety of ingenious labor-saving machinery made by the C. W. Hunt Co., no class strikes us as more important or interesting than that which is adapted to the economical handling of coal from the receiving point to the furnace, and of ashes away from the furnace. In the pamphlet which is just issued, which the company indicates as catalogue No. 94,082, several solutions of special problems in power-station, coal-handling plants are given. Incidentally cuts and descriptions of details of coal handling machinery, of light railroad equipment, and of boiler-house arrangements appear. A case of particular interest, which is very well shown, is that of the Eastern Station of the Brooklyn Heights Railroad Co., which has a plant of 36 Babcock & Wilcox boilers of 270 horse-power each. Here the coal had to be lifted over 100 ft. vertically, and then carried horizontally in two directions, at right angles to each other. The conveyor moves horizontally and then vertically, and while moving vertically the buckets change direction by a twist in the conveyor chain, turning a right angle, so that when the conveyor again moves horizontally the direction of motion has been changed 90 degrees. The Southern power station of the same railroad is also interesting.

Heat Insulation and Fire Protection.—The H. W. Johns Manufacturing Co., of New York and other cities, issues a small catalogue advertising the use of its asbestos pipe and boiler covering in large buildings. The illustrations include Machinery Hall at the World's Fair, one or two other World's Fair buildings, the Masonic Temple, Chicago, the new City Hall in Philadelphia, and a number of the largest buildings in various cities of the Union. It includes also some representation of the uses of this covering on the Third Avenue cable railroad in New York, in a big brewery, and in various other places. A copy of the pamphlet will be sent to anybody on application.

Valley, Plain and Peak is the title of a handsome advertising pamphlet of 100 pages, 5x6 inches, issued by the Passenger Department of the Great Northern Railway. It is a model of its kind. Every right-hand page is filled with pictures, either a full-page direct process or etched photographic view or group of several views, all apparently new and original. The text, on the left-hand pages, is terse, sensible and modest. The wood-cut sketches interspersed with the text are new and artistic, and really help to an understanding of the subjects described. The pamphlet was made by Rand, McNally & Co.

General Passenger Agent Whitney has also issued *An Atlas of the Northwest*, containing colored maps, 12x20 inches, of the States through which his road runs. The names on the maps are shown in letters easily readable and yet small enough so that they do not have to be crowded, a merit well worthy of mention. The maps are accompanied with carefully-prepared descriptive matter and make a really valuable geographical text book. We can well believe the statement that school teachers throughout the Northwest and in other parts of the country have asked for and use this atlas. The maps are corrected to July, 1894, and are the work of the Matthews-Northrup Company.

Friction Clutch Pulleys.—The E. W. Bliss Co., Brooklyn, N. Y., has issued a catalogue of friction clutch pulleys. The catalogue shows a new clutch for the manufacture of which the company has established a special plant. The special features of excellence claimed are a friction disk flexibly connected to the pulley, against the sides of which the clutch members grip; only two clutch members, one keyed rigidly to the shaft, the other movable; the levers so balanced that at any speed the centrifugal force has no tendency to throw the clutch in or out of operation. Beyond this simplicity and compactness are claimed.

Journal of the Association of Engineering Societies.—The September issue of this journal contains a valuable article by Mr. Charles V. Weston, on the West Chicago Street Railroad Tunnel, with several illustrations. Another article is on "Typhoid Fever and the Epidemic at Ironwood, Mich.," by E. A. Rudiger. Mr. Samuel Whitney writes an article on "Asphalt Pavements," which occupies 20 pages, and is a valuable monograph. Other articles are "Corrosion of Iron Pipes by Electrolysis," by Prof. Dugald C. Jackson, and "A Covered Reservoir at Rockford, Ill., by Charles C. Stowell.

Hammers.—The David Maydole Hammer Co., Norwich, N. Y., issues a handsome catalogue of its cast steel hammers. The catalogue shows hammers for carpenters, farriers, blacksmiths, machinists and other workers.

Fire Hose.—The Boston Belting Co. issues a new catalogue devoted especially to fire hose and fittings.

American Street Railway Association.

(Concluded from page 739.)

Composite Brake Shoe Co., Boston, Mass., exhibit of "Compo" brake shoes which have run over 20,000 miles.

Walker Mfg. Co., Cleveland, O., complete motor equipment; 250 K. W. generator, spring mounted steel motor; two motor truck, showing method of suspension, and electric street car equipments.

Peckham Motor, Truck & Wheel Co., Kingston, N. Y., two full-sized trucks equipped with motors and model of the Peckham truck; interchangeable wheels.

Chapman Valve Mfg. Co., Boston, Mass., gate valves for steam, water and ammonia.

The Stirling Co., Chicago, Ill., model of water tube boiler under steam and pressure.

International Register Co., Chicago, Ill., stationary and portable aluminum faced street car fare registers.

William Wharton, Jr. & Co., Inc., Philadelphia, Pa., steel street car rails; track materials and brake shoes.

Street Car Advertising Co., New York, sample advertising cards and frames.

Veneer Seating & Church Furniture Co., Brooklyn, N. Y., perforated veneer and solid seatings.

Brooklyn Car Wood & Veneer Works, Brooklyn, N. Y., wood-work for cars, ceilings, fillers, etc.

General Electric Co., Schenectady, N. Y., model of "K" controller, (series parallel), illustrating magnetic blow-out principle; complete controller; magnetic fuse box showing fuse blown on 4400 amperes, 550 volts; complete switchboard for electric railroads with total current and feeder panels; underground feeder tubes and a line of general electrical supplies.

Jewell Belting Co., Hartford, Conn., dynamo belts and bell cord for street railroads.

Card Electric Co., Mansfield, O., series multiple controller; double motor equipment for interurban roads.

Fulton Truck Foundry Co., Mansfield, O., Robinson radial drawbar; double and single steel trucks; "Imperial" hydraulic motor lift; "Troy" sand box; improved track cleaners and ticket destroying machine.

Berlin Iron Bridge Co., East Berlin, Conn., large section of a station shed lined with their anti-condensation roof lining.

R. W. Hollis, Atlanta, Ga., automatic magnetic cut-out for motors; automatic electric elevator controller; combination double pole switch and rheostat.

Russ Car Fender Co., Washington, D. C., model of car fender.

Western Telephone Construction Co., Chicago, Ill., different styles of telephoning apparatus and appliances.

H. E. Harris, Rochester, N. Y., combined life guard and snow sweeper.

R. Bliss Mfg. Co., Pawtucket, R. I., Woods platform gate.

Independent Electric Co., Atlanta, Ga., fuse wires.

Washburn & Moen Mfg. Co., New York, insulated wires.

Hubley Mfg. Co., Lancaster, Pa., full line of overhead trolley line material.

Wheeler Reflector Co., Boston, Mass., reflectors for street railroad use.

R. Woodman Mfg. Co., Boston, Mass., street railroad ticket punches and specialties.

Empire Electric Insulation Co., Schenectady, N. Y., insulating cloths, papers and tape.

Beacon Vacuum Pump & Electric Co., Boston, Mass., new Beacon incandescent lamp.

Car Equipment Co., Philadelphia, Pa., Allen trolley line material.

R. A. Crawford Mfg. Co., Pittsburgh, Pa., complete fender equipment for trolley cars.

Niles Tool Works, Hamilton, O., hydraulic press, lathe and boring machine.

Bass Foundry & Machine Works, Fort Wayne, Ind., complete line of street and surface railroad car wheels.

McGuire Mfg. Co., Chicago, Ill., Columbian magazine cast iron street car heater; this company also exhibited their truck applied to several trolley cars in Atlanta.

Michigan Electric Co., Detroit, Mich., overhead trolley line specialties and signal light for electric cars.

Consolidated Car Heating Co., Albany, N. Y., complete system of electric car heating apparatus.

Sterling Supply Mfg. Co., New York, the Sterling sand box and all kinds of street railroad supplies.

Henry J. Winser, New York, Vernon fare register.

Maxwood Brake Shoe Co., La Crosse, Wis., compressed wood brake shoes.

The E. T. Burrows Co., Portland, Me., inside car shades; section of open street car showing the "Oakette" waterproof car shade; 150 samples of car shade designs and a cabinet showing different styles of shades.

Young Lock Nut Co., New York, Young lock nut and the Brownley injector.

E. T. DeWitt & Co., tin sand boxes operated by foot power. Hale & Kilburn Mfg. Co., Philadelphia, Pa., car seats and springs and rattan canvas lined covering.

New Haven Car Register Co., New Haven, Conn., single and double carfare registers, and the New Haven triple register arranged for recording three different denominations of fares or two fares and a transfer.

Jackson & Sharp Co., Wilmington, Del., one open and one closed vestibule electric car, exhibited in service on the Conestoga street railroad.

Baltimore Car Wheel Works, Baltimore, Md., two Lord Baltimore electric street car trucks, one number 12 W. motor and other G. E. 800 motors, showing B. C. W. patent central suspension.

Scarritt Car Seat Co., St. Louis, Mo., longitudinal seats in rattan and plush and reversible seats in rattan, leather and plush.

Chicago Rawhide Mfg. Co., rawhide gear wheel.

H. W. Johns Mfg. Co., New York, moulded mica overhead trolley materials; overhead electric switches; Graaten rail bond; asbestos pipe coverings and fittings, packings, gasket, fire proofing goods and asbestos clothing; also numerous samples of vulcanite pieces used in insulating street car controllers, feed magnet spools, brush holder bushings and other parts used in the manufacture of electrical apparatus.

Gennett Air Brake Co., New York, exhibited one of the first air brakes used on surface steam railroads, and the open style pump which followed, together with one of their latest double action pumps. They also had their entire air brake equipment on one of the Atlanta Consolidated Street Railroad cars, which made regular trips between the city and the convention grounds.

J. G. Brill Co., Philadelphia, Pa., three cars in actual service on the Consolidated Street Railroad between the hotel and grounds; snow sweeper in operation; 21 B. truck; end of car showing vestibule application for open end closed cars, and sandbox; scrapers; car body jacks; car fender, and a separate truck frame, forged in one piece.

Paige Iron Works, Chicago, Ill., section of double track with switches and crossings arranged for both girder and T-rails; T-rail work representing section of track based on steel ties, showing brick pavement, etc., as used by the Terre Haute Street Railway, of Terre Haute, Ind.; and street and steam railroad crossings of two different styles.

The Johnson Co., Johnstown, Pa., a branch-off of 9 in. guard rail construction weighing 117 lbs. to the yard, with a spring tongue switch and curve cross and mate; 4 in. girder construction of curve cross; new "Dupont" truck; different styles of joints for 10½-in. high rail; standard girder joints and combination joints for 9-in. rails, and complete model showing 50 different styles of girder rails.

The Ohio Brass Co., Mansfield, O., full line of trolley construction devices and overhead hangings; type "W" trolley hangers; motor bearings; Wood flexible pole bracket; Spillman trolley car; Jewell trolley sling; pneumatic quick-break switch; Woods' adjustable trolley switches and crossovers; reversible and adjustable track broom holders; the "Ohio" trolley; self-locking trolley harp wheels and headlights for trolley and cable cars.

Pennsylvania Steel Co., Steelton, Pa., two curved rails, 6½ degrees, which make an absolute reverse curve; 9-in. four girder rail built crossing; light cast steel tongue switch and mate; two cast steel frogs, 9-in. rail; built frogs, 9 and 10-in. rail; one corner crossing; a pyramid of rail sections ranging from the 9-in. girder to the 4½-in. T-rail; the plates and braces; rail chairs; "Acme" rail brace and a built switch and mate of 6-in. T-rail.

Exhibits in connection with the Convention, but not located at or near the ground, were a model of the truck in use on the Broadway cable road, this city, and the exhibit of the Westinghouse Electric & Mfg. Co. of Pittsburgh. Both of these were located in the Aragon Hotel. The latter was in charge of Mr. Alex. J. Wurts, who illustrated, by experiment, the fact that lightning will follow a leading track rather than jump across the space. The machine which Mr. Wurts used was the first of its kind ever constructed. Mr. Wurts used this experiment in connection with a lightning arrester of his invention, and which is manufactured by the Westinghouse Co.

TECHNICAL.

Manufacturing and Business.

The new Raleigh car-wheel works, at Raleigh, N. C., began operations Oct. 20, with a capital of \$100,000. The Raleigh plant begins with a capacity of 40 wheels a day, employing 50 hands; but the capacity of the plant will be gradually increased. William E. Ashley, the superintendent of the North Carolina Car Co., an establishment which has been in existence in Raleigh 12 years, is a large stockholder in the car-wheel works, and the plant is controlled by the North Carolina Car Co. Mr. Ashley says that it is the intention of his company to establish on the 26 acres of ground adjoining the Seaboard Air Line tracks and the present shops in Raleigh, a number of small manufacturing plants. The equipment for the car-wheel works was furnished by the Lobdell Car-Wheel Co., of Wilmington, Del. Mr. Robert C. Tolmie, of the latter company is superintending the starting of the works. Mr. Tolmie will not be the permanent superintendent of the Raleigh establishment, but when he returns to Wilmington he will leave at Raleigh a number of experienced workmen formerly at the Wilmington shops. All of the iron ore and coke and coal used will be taken from North Carolina and other Southern mines, exclusively.

A large part of the extensive plant of the Tredegar Iron Works, at Richmond, Va., was burned on Oct. 18. The fire originated in the car-shop. The horse-shoe, blacksmith, pattern, and car-shop and numerous sheds were consumed. The loss is about \$150,000, covered by insurance.

The Duquesne Steel Works, of the Carnegie Company, has placed an order with the Babcock & Wilcox Co., for a 1,500-h. p. boiler to be placed in the works.

New Stations and Shops.

The Baltimore and Ohio has decided to change the location of the termini of its three divisions, all of which now end near about Cumberland, Md. The first division now ends at Martinsburg, W. Va., the second at Keyser, W. Va., and the Pittsburgh & Western division at Cumberland. All of these are within 30 miles of Cumberland, and the terminals will all be centered at that point. The plans have already been completed for a roundhouse to accommodate 42 locomotives, and this will be the largest round house on the system. The land was bought at Cumberland several years ago, and since then the necessary grading has been done, and the room thus made has been in use. A large shop will also be built for repair work. The city of Cumberland has voted to issue bonds for \$150,000 to assist the company in its plans. The information is given on the authority of an officer of the company.

The Ottawa, Arnprior & Parry Sound workshops are to be located at Ottawa, a site for the works having been

purchased at a cost of \$15,000 on the outskirts of the city.

The Denver Union Station, which burned last spring, will be ready for occupancy by January. It has been remodelled, enlarged by the addition of a third story over the main portion of the building, and will be provided with many modern improvements.

The Baltimore & Ohio shops at Zanesville, O., are being repaired and extended with a view to increasing the working force.

The Philadelphia & Reading has prepared plans for two large new buildings adjoining its present shops at Reading, Pa. A machine shop 200 ft. long will be built, and the second structure will be 282 ft. long, and will be used as a car paint shop.

Iron and Steel.

Morton Stewart, Chairman of the Stockholders' Re-organization Committee of the Maryland Steel Co., states that the plant at Sparrow's Point will resume operations about Nov. 1. The works, which employed 3,000 men, were shut down eight months ago.

Car Lighting.

The new "Sunset Limited" train of the Southern Pacific will be lit throughout by the Pintsch light, a seven days' supply of gas being taken from the plant at Oakland, Cal. But one filling will be necessary for the trip from San Francisco to New Orleans and return, 4,978 miles.

The Panama Canal.

The new Panama Canal Co. has been legally constituted, and the agent at Bogota has been instructed to announce the fact to the Columbian Government. The despatch from Panama, which brings this news, says also that on Monday of this week 800 workmen resumed work on the Culebra section, all of which probably means the wasting of more fools' money.

Lighting the Brooklyn Bridge Cars.

The decision as to the method of lighting the cars of the New York & Brooklyn Bridge will probably be made soon if it has not been made already. A meeting of the Trustees was to have been held on Tuesday of this week to open bids and probably to award the contract. That meeting, however, was postponed, but it is supposed that it will have been held before this is published. Whatever the decision is it will probably be for some form of electric lighting.

Car Heating.

The Consolidated Car-Heating Co., Albany, N. Y., has just received orders for the entire equipment of the Norfolk & Western with its commingler storage system and Sewall steam coupler. The Consolidated Company has also received orders for the entire equipment of the Ulster & Delaware, with its direct steam system No. 2, and the Sewall steam coupler. The orders include equipment of all locomotives on both these roads with the Consolidated improved locomotive equipment.

The Melan System of Bridges.

Tests of concrete and iron floor arches on the Melan System (see a very full description in the *Railroad Gazette*, April 13) are to be made in New York, and five of these arches have been recently built. One arch is 7 ft. span and 6 ft. wide, with three 4-in. I-beams 3 ft. apart. Two others are similar, but of 6 ft. span, and the remaining two are 6 ft. span and 4 ft. wide, with 3 T-bars 3x3 in. 2 ft. apart. The iron arch beams rest between 12-in. I-beams, which latter are held together by means of angles to an unyielding frame. Upon the wooden centerings was laid the concrete arch, 4 in. thick, composed of one part Manheim Portland Cement, two parts sand and four parts ¾-in. stone, well rammed against the sides of the arched beams, and backed up to the under side of the top of the flanges of the 12-in. beams. The construction was under the supervision of Mr. Fr. von Emperger, who represents the Melan System in this country, and Mr. Geo. Hill, M. Am. Soc. C. E.

An Aluminum Torpedo Boat.

Messrs. Yarrow & Co. have recently built for the French Government an aluminum torpedo boat, which has been tried on the Thames, and which is said to be the largest vessel yet built of aluminum, and indeed the largest structure of any kind yet produced in that metal. This craft is 60 ft. long, 9 ft. 3 in. beam. She has triple-expansion engines and an aluminum bronze propeller, running at from 580 to 600 revolutions a minute. The boiler is of the Yarrow, water-tube type. On her official trial, the 20th of September, a mean speed of 20.5 knots an hour was developed; the boiler pressure ran from 175 up to 185 lbs. The saving in weight as compared with steel boats of the same sort built for the British Navy is about two tons, and the gain in speed about 3½ knots. The extra cost of material is said to have been about \$5,000. The metal used is aluminum, alloyed with about 6 per cent. of copper, having a tensile strength of about 18 tons per square inch. The scantlings were increased 25 per cent. in sectional area over the proportions for steel and the weight of the hull was reduced one-half. The plates are triple riveted with aluminum rivets.

The Master Car Builders' Gages.

Replies to circular dated Sept. 4, in regard to gages recently adopted by the Association, do not indicate that orders for 50 sets can be assured at the prices quoted by gage manufacturers. Many of the replies indicate that the prices quoted are considered too high, and that gages have been, or will be, made by the companies at their

own shops. The Executive Committee has again considered the question, and decided that it cannot effect satisfactory arrangements with gage manufacturers for these gages. It recommends that railroad companies making these gages should have the large lithograph drawings of them from the office of the secretary, so that the gages may be properly made in so far as the essential or gaging dimensions are concerned.

The Executive Committee has examined the 15 sheets of lithograph drawings showing all the standards and recommended practice revised to date, that is, including changes and new matter since the ballot of 1894, and believes that members do not fully appreciate the importance of having a full set of these drawings for reference in following M. C. B. standards as thoroughly as possible. The secretary has, therefore, been instructed to call attention again to this matter, as coming from the Executive Committee with its recommendation as above. When originally issued in 1893, there were sheets 1 to 11, inclusive, of M. C. B. standards, and sheets A and B of recommended practice. By the ballot of 1894, sheets 1, 2, 3, 8 and A were revised, and sheets 12 and C were originally issued, so that there are now sheets 1 to 12, inclusive, of M. C. B. standards, and sheets A, B and C of recommended practice, all as revised and completed to date.

The new sheets of 1894, Nos. 12 and C, are as follows:

SHEET 12:
Standard Terms and Gaging Points for Wheels and Track.
Standard Guard Rail and Frog Wing Gage.
" Check Gage for Mounting Wheels.
" Wheel Tread.
" Flange Thickness Gages for New Wheels.

SHEET C. Recommended Practice for
Journal Bearing and Wedge Gages.
Safety Chains for Freight Cars.
Minimum Thickness of Steel Tires.
Dummy Coupling Hook.

These lithographs are made on thin semi-transparent paper, so that blue prints may be taken therefrom the same as from tracings. They are sold at 25 cents per copy, or \$3.75 for a set of 15 sheets.

THE SCRAP HEAP.

Notes.

The United States Grand Jury at Pittsburg, Pa., which last week indicted Mr. C. S. Wight, of the Baltimore & Ohio for giving illegal rebates on freight, has found a bill against Mr. James Means, of the Pittsburg, Cincinnati, Chicago & St. Louis, for a similar offense. A press despatch this week says that the case against Mr. Wight has been adjourned until next May.

The roundhouse and eight locomotives of the Inter-colonial Road were burned at Riviere du Loupe, Que., on Oct. 20.

It is reported that on the lines of the Southern Railway in Alabama the baggage men on passenger trains are to be discharged and the work placed in the hands of the express messengers. A despatch from San Francisco reports similar action on the part of the Southern Pacific.

The United States Grand Jury in Chicago on Oct. 19, rendered indictments against E. V. Debs and 68 other men of the American Railway Union for obstructions of the mails and other violence.

The Boston Transcript says that the abolition of grade crossings on the line of the Boston & Albany in Newton, Mass., is likely to be postponed at least six months. This project is a costly one, involving the elevation or depression of the railroad for about five miles, and the citizens are so decided in their views as to how the change should be made that they are working to have the matter delayed until they can get a special act passed by the Legislature.

At the annual meeting of the stockholders of the New York, New Haven & Hartford at New Haven, Conn., on Oct. 17, there was much complaint concerning the by-laws under which the Directors conducted the meeting. These by-laws, adopted during the past year, limit the business of the meeting to matters stated in the call, and the call was for the election of officers only. It is said that the rules were drawn for the purpose of choking off Henry C. Goodwin, of East Hartford, who makes a complaint of some kind against the management nearly every year. The rules seem to have offended others besides Goodwin, however, and it is said they will be modified.

The Union Pacific Coal Company has notified J. F. Pierce, People's Party candidate for State Auditor of Wyoming, that he must either resign from the service of the company or withdraw from the ticket. The order comes from the Union Pacific receivers. The State law prescribes a fine of from \$100 to \$500 when any individual or corporation in any way interferes with the candidacy of an employee for public office. Chairman Merritt, of the Populist State Committee, offers a reward of \$1,000 for the conviction of any person so offending.

The run of every passenger conductor on the Grand Trunk has been changed in accordance with action of the Directors at the annual meeting, who decided to place conductors upon divisions where they are less acquainted and less susceptible to temptation. The order applies to conductors on all the company's lines, both in Canada and the United States.

Train Robberies.

The number of train robberies this week is the same as last—to wit, two. Near Gordon, Tex., on the 19th, a train of the Texas & Pacific was stopped at midday by a band of armed horsemen, unmasked, who are said to have taken \$4,000 or more. They compelled a scuin master to take up two rails and flag the train.

At Corretta, near Wagoner, I. T., on the evening of the 21st, a train was stopped by the "Cook gang" and robbed of a small amount, said to be less than \$500. The through safe was not opened. The passengers were intimidated by pistol shots, and the reports say that every window in the train was riddled with bullets. This train was stopped by the misplacement of a switch when the train had approached within a few feet of it, and the engine collided with some empty cars standing on the side track. Three of the cars were wrecked, blocking the main track. One passenger was shot and dangerously wounded. The robbers were negroes and half-breeds.

Press despatches report large parties of sheriffs searching for the robbers in both Indian Territory and Texas. A man has been arrested at Cumberland, Md., and another at Cincinnati, O., who are believed to have taken part in the robbery near Quantico, Va., on Oct. 11. One of them is said to have made a confession.

Russia's First Narrow-Gage Railroad.

Commenting on the recent granting of a franchise for a 125-kilometer (78-mile) narrow-gage railroad, to be built in the Government of Wilna, in Russia, the *Strassenbahn*, a German street railroad journal, takes occasion to point out that the first narrow-gage railroad in Russia was opened on Sept. 14, 1892, and has been operated successfully ever since. It is the St. Petersburg-Ochta-Irinowka line, better known simply as the Irinowka road, and was built during the summer months of 1891 and 1892. The total length of the line is 33½ versts (about 22 miles), and the gage is 750 mm., or about 30 miles. The locomotives in use are four-wheeled tender engines, rated at from 30 to 40 horse-power. The entire road was built and equipped by the German firm of Arthur Koppel, of Berlin.

Car-Burning in Chicago.

A press despatch from Chicago, Oct. 23, says: The deeds of violence which characterized the recent great railroad strike were repeated last night at Grand Crossing and South Chicago by a gang of hoodlums. An Illinois Central suburban train was boarded by a crowd of roughs, who abused the crew, calling them "scabs." They were finally ejected. When the train reached Wildwood the station was burning, and while the trainmen devoted themselves to extinguishing the flames the ruffians set fire to a train of box cars on a side track, one car being totally destroyed. When the train again started it was found that all the signal lamps had been removed and placed under the wooden work of the roadway, the structure burning like tinder. The flames were smothered with sand and cinders, but not until the track in places was so weakened that supports had to be placed under it.

A Railroad in Venezuela.

The United States Consul at Maracaibo, Venezuela, reports that the government of that country has made a contract with a Spanish company for the construction of a railroad from Puerto Cabello to Cariaco. The road is to be built in four years and the government is to have 5 per cent. of the net receipts from the company. From the despatches we have seen we do not learn what the concession is.

New Coal Storage Plant at Port Richmond.

The Receivers of the Philadelphia & Reading Railroad have presented a petition to Judge Dallas, of the United States Circuit Court, at Philadelphia, for permission to negotiate a loan of \$160,000, for the purpose of erecting an extensive coal storage plant at Port Richmond. The plant will be located on property to the north of the present tracks at Port Richmond, which covers an area of 600 ft. by 1,800 ft. The coal storage plant will consist of six coal-trimming, or piling machines; two of 20,000 tons capacity, two of 30,000 and two of 40,000 tons, making a total capacity of 180,000 tons, which may be increased by cutting, to about 200,000 tons. The plant will be adapted to receive and store coal at the rate of between 5,000 and 6,000 tons in ten hours, and by the use of re-loaders coal can be taken from stock, screened and loaded into cars at the same rate. The plant to be erected is guaranteed to store and reload the coal at cost not exceeding 5 cents per ton for both operations. The difference between this cost and the present cost of handling coal at Port Richmond will, it is estimated, effect a saving of about \$40,000 a year. The new plant will be erected by the Dodge Coal Storage Company, of Philadelphia.

Mr. Corthell and the International Institute.

Mr. E. L. Corthell writes from Beine, Switzerland, that he is recovering from his illness, and that he hopes soon to be well again.

Copies of his proposition for an International Institute of Engineers and Architects have been sent out, with accompanying letters, to 133 engineering societies and 147 individual engineers, a total of 280 copies sent to thirty-four different countries. About fifty copies have been sent also to architectural societies in the United States and other countries.—*Journal of the Association of Eng. So.*

Army and Navy Notes.

The Navy Department has accepted a lot of Howell torpedoes from the Hotchkiss Co.

The Ordnance Board of the United States Army has recently made rather extensive tests of six-pounder rapid fire guns. The guns which competed were the Driggs-Schroeder, Hotchkiss, Maxim-Nordenfelt, Seabury, and Sponzel. All of the guns passed the test without material injury except the Sponzel gun. The best showing was made by the Driggs-Schroeder and Hotchkiss, between which honors were about evenly divided. Observations made for the temperature of the guns after repeated firing showed as a rule that after 75 rounds the heat was sufficient to melt soft solder placed upon the chase of the gun, indicating a temperature of 375 degrees F. In one case the heat was sufficient to melt rosin in the same way after 20 rounds, and in another a temperature of about 600 degrees was indicated by the softening of lead placed upon the chase of the gun.

The United States Composite Cruiser Maine had an official trial Oct. 17, in Long Island Sound, sailing from New London. It is estimated that her engines will develop 9,000 horse-power, which is the contract requirement, and that there may be an excess of from 400 to 600. A run of 25 miles was made at an average speed of 15.25 knots per hour which, making allowance for the tide, is increased to 17.25.

Lieutenant Karmy, U. S. Marine Corps, has recently reported the results of experiments on cadavers with the new small calibre rifle adopted for the navy. The calibre is .236, and the projectile nickel-coated, smokeless powder being used. At ranges of from 50 to 300 yards the effect on bones resembled that of an explosive projectile. Fragments were frequently carried through the wound of exit, the muscles pulped, and the limb damaged seriously. Passing simply through a muscle the wound is very small, and the damage slight, unless an artery is struck,

when it is cut as with a knife. Persons familiar with gun-shot wounds with large projectiles, at comparatively low velocities, know that arteries are often pushed aside and uninjured, but with the new projectile they are pretty sure to be severed.

A 12-inch armor plate of Harveyized nickel-steel was recently tried at the Bethlehem proving grounds. It was one of the plates for the side armor of the Texas. It was attacked by two shots from a 8-inch rifle. The first had a velocity of 1,678 ft., the second 2,004 ft. The Holtzer steel shell was used, weighing 250 pounds. Both shells were broken up, the points remaining in the plate. The plate itself was not cracked.

LOCOMOTIVE BUILDING.

The Pennsylvania shops at Columbus, O., this week turned out nine engines. The full force of this shop is 1,200, and at present over 1,100 men are at work on nine hours' time.

CAR BUILDING.

Three combination cars for the Northwest system will be completed this month at the Pennsylvania shops, at Columbus, O. Orders have been received for 20 ew cabin cars and 25 platform cars, all to be equipped with air brakes and automatic couplers.

The Boston & Albany is soon to ask bids for some new freight cars.

The Plant System is in the market for new freight cars; also the Florida Central & Peninsular, the Central of Georgia, the Cincinnati, New Orleans & Texas Pacific and the Southern Railway.

The Barney & Smith Car Co., of Dayton, O., has begun the delivery of the new passenger cars ordered in September by the Cleveland, Cincinnati, Chicago & St. Louis Railroad. So far about six of the new cars have been delivered to the railroad company. It will be remembered that the company lost nearly 30 cars in a fire in its freight house at Cincinnati in August. The Barney & Smith Car Co. received an order to replace the burned cars.

BRIDGE BUILDING.

Burlington, Wis.—The Wisconsin Central Railway Co. is about to build a new iron bridge across the Fox River where its right of way crosses the river near Burlington.

Providence, R. I.—Proposals will soon be called for building a bridge at this place to replace the present Red Bridge.

Regina, N. W. T.—The Government of the Northwest Territories is calling for tenders for the construction of a highway bridge across the Souris River, at Oxbow, N. W. T.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Baltimore & Ohio, semi-annual, 2 per cent., payable Nov. 15.

Boston & Maine, quarterly, \$1.50 per share on the common stock, payable Nov. 15.

Nashville, Chattanooga & St. Louis, 1 per cent., payable Nov. 1.

Pullman's Palace Car Co., quarterly, \$2 per share, payable Nov. 15.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Central Massachusetts, annual, Boston, Mass., Oct. 31.

Cleveland, Cincinnati, Chicago & St. Louis, annual, Cincinnati, O., Oct. 31.

Manhattan Elevated, annual, New York City, Nov. 14.

New Orleans & Northeastern, annual, New Orleans, La., Nov. 7.

Raleigh & Augusta Air Line, annual, Raleigh, N. C., Nov. 8.

Raleigh & Gaston, annual, Raleigh, N. C., Nov. 8.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The New York Railroad Club meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The New England Railroad Club meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The Central Railway Club meets at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of January, March, April, September and October, at 10 a. m. At the October meeting Mr. Morford's paper on "Terminal Yards" will be the opening subject for discussion.

The Southern and Southwestern Railway Club meet at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The Northwestern Railroad Club meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The Northwestern Track and Bridge Association meets at the St. Paul Union Station, on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The American Society of Civil Engineers meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The Western Society of Engineers meets on the first Wednesday in each month, at 8 p. m. The headquarters of the society are at 51 Lakeside Building, Chicago.

The Engineers' Club of Philadelphia meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The Engineers' and Architects' Club of Louisville meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday in each month, at 8 p. m.

The Association of Engineers of Virginia holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The Boston Society of Civil Engineers meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The Engineers' Club of St. Louis meets in the Missouri Historical Society Building, corner Sixteenth street

and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Foundrymen's Association* meets at the Manufacturers' Club, Philadelphia, Pa., on the first Wednesday in each month.

The *Western Foundrymen's Association* meets in room 701, Western Union Building, Chicago, on the third Wednesday of each month. B. W. Gardner, Monadnock Block, Chicago, is secretary of the association.

Superintendents of Bridges and Buildings.

The fourth annual meeting of the American International Association of Railway Superintendents of Bridges and Buildings was held in Kansas City, beginning Oct. 16. The Mayor of the city delivered an address of welcome. About 175 members and their friends were present. Among the papers presented were the following:

"Depressed Cinder Pits and Other Kinds," report by Walter G. Berg, Lehigh Valley, Jersey City, N. J.

"Interlocking Switch Signals," A. T. Shane, Big Four, Lafayette, Ind.

"Best Methods of Bridge Inspection," G. M. Reid, Lake Shore, Cleveland.

"Pumps and Boilers," by C. W. Markley, Big Four, Crawfordsville, Ind.

"Maintenance of Pile and Frame Trestle," W. McGonigle, Duluth & Iron Range, Two Harbors, Minn.

"The Best Foundation for Track Scales," O. J. Travis, Elgin, Joliet & Eastern, Joliet, Ill.

Western Society of Engineers.

A regular meeting was held at the Grand Pacific Hotel, Chicago, Oct. 3, President Herr in the chair. Mr. Onward Bates presented a paper, entitled "Notes on a Broken Pinion Shaft," which was read by the secretary. The paper was illustrated by photographs showing a peculiar fracture of a wrought iron shaft used in a railroad bridge. The paper was discussed by Messrs. Goldmark, Finley and Artingstall.

Mr. T. T. Johnston read a paper on "General Hydraulics of the Chicago Main Drainage Channel." The paper treated of the grade and cross-section of the channel; its effect on the great lakes; the effect of the Des Plaines River; its effect on the Illinois and Mississippi Rivers, etc. It was copiously illustrated by large maps and diagrams. The paper was discussed by Messrs. Rosister, Cooley and W. E. Williams.

The next meeting of the Society will be held at the Grand Pacific Hotel, Nov. 7, and the discussion of Mr. Goldmark's paper on Strains and Deflections in Solid Bridge Floors will be continued. Members are asked to arrange to dine on that evening at the Grand Pacific Café, where special tables will be reserved for them and their guests.

The American International Association of Superintendents of Bridges and Buildings.

The fourth annual meeting of the American International Association of Railway Superintendents of Bridges and Buildings was held in Kansas City, Mo., Oct. 16 to 19, 1894, with headquarters at Coates' Hotel. The meeting was called to order at 10 a. m., on Tuesday morning, Oct. 16, by President J. E. Wallace (Wabash), of Springfield, Ill. Speeches of welcome were made by prominent city officials and responded to by members of the visiting association. There was a total attendance of about 60 members, in addition to a large number of visitors, chiefly prominent railroad officials. Twenty-one new members were enrolled.

The remainder of the morning session was occupied by the annual address delivered by President Wallace and by other routine business, appointment of committees, etc.

The order of business for the afternoon session was the reading of Committee Reports on subjects assigned at the last convention in Philadelphia.

The Committee on "Depressed Cinderpits," consisting of Walter G. Berg (Lehigh Valley), George W. Andrews (Baltimore & Ohio), R. M. Peck (Missouri Pacific) and Abel S. Markley (Pittsburgh & Western), presented a very exhaustive report on the subject, classifying and reviewing the existing practice and submitting recommendations. This report was accompanied by a large number of drawings and an appendix, in which the valuable detail data collected by the committee had been compiled for easy reference.

The Committee on "Best Method of Bridge Inspection," consisting of G. M. Reid (Lake Shore & Michigan Southern), J. M. Staten (Chesapeake & Ohio), E. T. Wise (Illinois Central) and J. S. Berry (S. T. & S. W., Texas), presented a report giving the general opinions, experience and practice of the members.

The Committee on "Maintenance of Pile and Frame Trestles," consisting of W. A. McGonigle (Duluth & Iron Range), J. H. Markley (Toledo, Peoria & Western), George C. Nutting (C. C. & C.) and John Copeland (C. St. P., Minn. & O.), presented a large number of blue prints of standard trestle plans with a report in which the subject was discussed under the following heads:

1. Piling—Size, kind of timber, best weight of hammar to use in driving; 2. Length of span; 3. Stringers—Number, size and best timber; 4. Ties—Size, length and distance centers; 5. Guard rails—Size, length and framing design; 6. Drift bolts and packing bolts; 7. Cast washers and packing blocks; 8. Best method of framing trestles; 9. Economy of preserving bridge timber and best method.

The Committee on "The Best Scale Foundation," con-

sisting of O. J. Travis (E. J. & E.), Joseph Doll (C. C. & St. L.), C. D. Bradley (St. L. & San Francisco) and T. M. Strain (Wabash), presented a report giving the individual views and practice of the members with valuable suggestions and recommendations.

No evening session was held, in order to give the committees appointed at the morning session time to meet and prepare their reports.

The morning and afternoon sessions of Wednesday, Oct. 17, also the morning session of Thursday, Oct. 18, were occupied in discussing the reports presented by the committees above mentioned. A very large number of members participated in the discussions, especially on the subject of "Maintenance of Pile and Frame Trestles" and "Inspection of Bridges."

On Thursday afternoon the time was occupied by routine business, appointment of committees on subjects for next year's convention, election of officers, resolutions, etc. The convention adjourned at 4 p. m., to meet next year at Atlanta, Ga., on the third Tuesday of October.

The subjects for papers to be read and discussed at next year's convention are as follows:

1. Mechanical action and resultant effects of motive power at high speed on bridges.
2. Methods and special appliances for building temporary trestles over washouts and burnouts.
3. Strength of various kinds of timber used in trestles and bridges, especially with reference to the Southern Yellow Pine, White Pine, Fir and Oak.
4. Best method of erecting plate girder bridges.
5. Best and most economical railroad track pile driver.
6. Sand dryers, elevators and methods of supplying sand to engines, including buildings.
7. Span limits for different classes of iron bridges and comparative merits of plate girder and lattice bridges for spans from 50 to 110 feet.
8. Best method of spanning openings too large for box culverts, and in embankments too low for arch culverts.
9. Best end construction for trestles and adjoining embankments.
10. Interlocking signals.
11. Pumps and boilers.

The following officers were elected for the coming year:

President, George W. Andrews, Baltimore & Ohio, Philadelphia.

First Vice-President, W. A. McGonigle, Duluth & Iron Range, Two Harbors, Minn.

Second Vice-President, L. K. Spafford, Kansas City, Fort Scott & Memphis, Kansas City, Mo.

Third Vice-President, James Stannard, Wabash, Morley, Mo.

Fourth Vice-President, Walter G. Berg, Lehigh Valley, Jersey City, N. J.

Secretary, S. F. Patterson, Concord & Montreal, Concord, N. H.

Treasurer, George M. Reid, Lake Shore & Michigan Southern, Cleveland, O.

Executive Committee, James Stannard, Wabash, Morley, Mo.; James H. Travis, Illinois Central, Chicago, Ill.; Joseph H. Cummin, Long Island Railroad, Long Island City, N. Y.; R. M. Peck, Missouri Pacific, Pacific, Mo.; J. L. White, Texas Midland, Terrell, Tex.; A. Shane, Cleveland, Cincinnati, Columbus & St. Louis, Lafayette, Ind.

The members visited, by invitation of the Armour Packing Co., the extensive slaughter and packing houses of that company. The lumbermen of Kansas City tendered a reception, at which Mayor Davis, of Kansas City, welcomed the members to the city. The local committee of the association, consisting of James Stannard (Wabash) and L. K. Spafford (K. C. F. S. & M.), had made arrangements for visiting a number of points of interest, including a trip on the Missouri River to examine the extensive government river protection work, after the adjournment of the convention. The regular work was not interrupted for sight-seeing or pleasure trips, so that the success of the convention from a business point was assured. The papers offered were of a high grade and the exchange of opinions of such a large number of practical men from all parts of the country is bound to be of great benefit to the companies represented and to the railroad interests at large.

Engineers' Society of Western Pennsylvania.

At the meeting held in Carnegie Lecture Hall, Allegheny, on Oct. 18, Mr. G. E. Tener read a paper on "Lake Shipments of Coal," in which he stated that in 1887 the shipments amounted to 1,854,122 tons, the Pittsburgh and Ohio districts furnishing respectively 51 and 49 per cent of this. The shipments increased yearly and in 1892 there were 3,373,462 tons, Pittsburgh sending 52% per cent, and Ohio 47% per cent. Last year owing to the depressed condition of trade there was a slight decrease in shipments as compared with the previous year. Mr. Tener described the various methods of handling coal at the lake ports and noticed the fact that until recently but little improvement had been made during the last quarter of a century.

Formerly cars containing coal were dumped into pockets with chutes that led to the vessels, but owing to the great waste by breakage incident to this method it was abandoned. The revolving crane and bucket were then introduced, and though not altogether satisfactory on account of considerable waste by breakage it is the ordinary method now employed. Mr. Tener said that his ideal plan was to have the coal loaded in boxes at the mines, conveyed then by cars to ports and placed in boats. The best plan yet in use was stated to be a machine which runs the car over the vessel on an incline of 60 degrees and thus by bringing it closer to the vessel than any other method, the breakage is not so great.

Mr. William White, Jr., read a paper on "Chemical Losses of Fuel," in which the loss of coal and coke by "weathering" was dwelt upon at some length and explanations were offered for some of the changes noticed.

Engineers' Club of St. Louis.

A regular meeting was held Oct. 17, President Crosby in the chair and 22 members and 7 visitors present.

Prof. Charles C. Brown addressed the club on "A New Method of Determining Sewage Pollution of Water. He showed that the pollution of rivers by sewage increased faster than the population itself. Discussion followed by Messrs. Seddon, Holman, Johnson, and Jewett, and Drs. Green, Ravold and Homan.

Engineers' Club of Philadelphia.

The regular meeting of the club was held on Saturday, Oct. 20, at 8 o'clock. The titles of the papers presented at the meeting were "Notes on Wrought Iron Bridge Specifications," by Silas G. Comfort, and the "Electrometallurgy of Gold and Silver," by A. L. Eltonhead.

At the meeting on Oct. 6, President J. C. Trautwine, Jr., was in the chair, and 48 members and visitors were present. The tellers reported the election of the following as members:

Professor W. L. Webb read a series of notes on the results of experiments to determine the resistance of atmosphere to the free fall of spheres, which he had made when an instructor at Cornell University.

The apparatus was described in detail, and the calculations from the data obtained were written out in full on the blackboard. The results obtained from six sets of experiments were also tabulated in a chart which was exhibited. The balls that were compared were of iron and wood, both finished by careful grinding to exact sphericity and diameters to within one one-thousandth of an inch. The volumes of air displaced and the shapes of the resisting surface were, therefore, identical for both balls. The grinding of the balls polished the surface of each of them and the skin friction was, therefore, practically the same in both cases. The heights dropped through were exactly the same, but the results show a much larger co-efficient of resistance for the iron ball and a material increase in the co-efficient for both balls in case of a short fall than with a longer one. Conclusions were deduced from these experiments for the relations between mass, acceleration, resistance, etc., and the results showed that atmospheric resistance does not vary as the square of the velocity. The paper will be published in full in the Proceedings of the club.

Engineering Association of the South.

The regular monthly meeting of the Association was held at headquarters in Nashville, Tenn., Oct. 11. Dr. W. L. Dudley presided. The Nominating Committee reported the following as candidates for officers and directors, two to be canvassed at the annual meeting in November, two nominations being made for each office: For President, Wm. L. Dudley, Nashville, Tenn., and Maj. Wm. Starling, Greenville, Miss.; for Vice-President, W. F. Foster, Nashville, Tenn., and Lewis Johnson, New Orleans, La.; for Secretary, W. B. Ross, Nashville, and Herman D. Ruhm, Nashville, for Treasurer, Wm. T. Young, Nashville, and W. M. Leftwich, Jr., Nashville; for Directors from Tennessee, J. Lodge, South Pittsburg, Tenn., J. J. Ormsbee, Tracy City, Tenn., and P. Gaines, Cowan, Tenn.; John Biddle, Nashville; W. T. Magruder, Nashville, and E. C. Lewis, Nashville; for Directors from Georgia, H. L. Collier, Atlanta, Ga., and A. V. Gude, Atlanta, Ga.; for Directors from Kentucky, C. O. Bradford, Louisville, and W. H. Spradlin, Mount Vernon, Ky.

The expected paper on Diamond Drilling not having been presented, the discussion of the best and cheapest culverts for areas under 50 square feet, begun at the previous meeting, was continued.

The application of Prof. Wm. H. Schuerman, Dean of the Engineering Faculty of Vanderbilt University, was received and referred to the Board of Directors.

PERSONAL.

—Mr. H. W. Diggins, Superintendent of the Springfield division of the Kansas City, Fort Scott & Memphis Railroad, has resigned that office, which he has held since 1879.

—Mr. Robert Rantoul has been appointed Division Freight Agent of the Northern Pacific Railroad, with headquarters at St. Paul. He is promoted from the office of Secretary to General Traffic Manager Hannaford.

—Mr. Joseph Herrin has been appointed Superintendent of the Atlanta & West Point, and the Western of Alabama road. He was for several years General Superintendent of the Iron Mountain division of the Missouri Pacific.

—Mr. Wilbur Lee has been recently appointed General Passenger Agent of the Oregon Railway & Navigation Co. He was formerly General Passenger Agent of the Lake Erie & Western Railroad. He resigned that office to go to the Union Pacific, but the last two years he has not been in railroad service. He is son of Mr. David Lee, Engineer Maintenance of Way of the Baltimore & Ohio Railroad.

—Mr. N. J. O'Brien has been appointed Train master on the main line of the Southern Railway between Alexandria and Danville, Va. He has recently been Superintendent of the Washington division of the Union Pacific, which comprises the Oregon Railway & Navigation Co.'s lines. When an independent Receiver was appointed for that property, Mr. O'Brien resigned and went to Omaha.

—Mr. Edward C. Munson, a well-known Boston contractor, died very suddenly at his home in Portland, Me., recently, of apoplexy. Mr. Munson, for a number of years past, was identified with the construction of many public works in the vicinity of Boston, and built many of the abutments on the Boston & Albany line out. With his father he carried to completion the work on the Hoosac tunnel after the failure of the original contractors.

—The changes in the operating department of the Seaboard Air Line still continue. The recent order of General Manager J. H. Winder abolishes the title of Division Superintendent. In place of these, two new offices, Superintendent of Roadway and Superintendent of Transportation, are created, both with headquarters at Atlanta, where the General Manager is also located. Mr. T. W. Whisnant, who has been Superintendent of the northern division at Portsmouth, becomes Superintendent of Roadway, and Mr. S. G. Dickenson has been given the title of Superintendent of Transportation.

—Mr. James Maglenn has been appointed to the new office of Superintendent of Motive Power of the Seaboard Air Line. This is another step in the concentration of the management of the roads operated under this organization. It has been previously marked by the appointment of a General Manager and the abolishing of the Division Superintendencies. Heretofore the mechanical department of each of the roads included in the route has been in charge of the Master Mechanic. Mr. Maglenn has held that office for nearly 20 years on the Carolina Central. His headquarters have been at Laurinburg, N. C., but under the new order will be removed to Raleigh.

—W. B. Biddle has been appointed Traffic Manager of the Atchison, Topeka & Santa Fe to succeed Mr. J. A. Hanley, resigned. Mr. Biddle has been Assistant Traffic Manager of that system since 1890. He is not yet 40 years old. He has been with the Atchison since 1878 and was for four years a freight brakeman. He has been in the traffic department since 1882.

—Mr. J. H. Streidinger recently met his death in some mysterious way on the Pacific Coast. His body was found washed ashore at San Diego. He was a civil engineer of considerable reputation and was at one time employed under General Newton on the Hell Gate work, New York. He was a member of the American Society of Civil Engineers (1876), the Technical Society of the Pacific Coast and the California Society of Civil Engineers.

—Mr. William H. Haydock, Superintendent of the Coast Division of the Southern Pacific Co., has resigned. Mr. J. L. Frazier, Superintendent of the San Joaquin division, has been transferred to the Coast division, and the former division will be abolished on Nov. 1. It is over 200 miles long, from Tracy to Bakersfield. The northern half will be added to the jurisdiction of A. D. Wilder, at Oakland, and the rest will be added to the

Mojave division, D. Burkhalter, Superintendent. Mr. J. H. Whited, Superintendent of the Truckee division, will be relieved on the same date, when the division will be transferred to James Agler, now Superintendent of the Shasta division. Mr. Agler will be succeeded by C. W. Cooley, now Resident Engineer at Dunsmuir. The office of Assistant General Superintendent, which was held for nearly 20 years by R. H. Pratt, and which he recently resigned, it is understood, will also be abolished. General Superintendent Filmore states that Messrs. Whited and Haydock will be assigned to other service.

ELECTIONS AND APPOINTMENTS.

Atlanta & West Point.—Joseph Herrin has been appointed superintendent of the railways of this company and of the Western of Alabama, with headquarters at Montgomery, Ala. He will have charge, under direction of the President and General Manager, of conducting transportation, station and yard service, and maintenance of roadway, bridges and buildings. He will also have general supervision over the locomotive and car departments.

Bangor & Aroostook.—The annual meeting was held in Bangor, Me., on Oct. 16, and the following Directors were elected: A. A. Burleigh, C. F. Bragg, J. P. Bass, Edward Stetson, B. B. Thatcher, C. A. Gibson and E. D. Stewart. A. A. Burleigh, of Houlton, Me., was elected President. C. F. Bragg, Vice-President; F. H. Appleton, Secretary, and Edward Stetson, Treasurer.

Chicago Great Western.—The office of Industrial and Immigration Agent has been created and W. J. Reed appointed to the position with headquarters at St. Paul, Minn.

Duluth, Missabe & Northern.—F. T. Gates, of New York, private secretary to John D. Rockefeller, has been elected President of the road.

East Stroudsburg & Matamoras.—The incorporators of this road are Simon Friedburger, Charles W. Grant, Gabriel H. Lang, James Potsdamer, Emile Reizenstein and Ellicott Fisher, of Philadelphia; James Joseph Gibson, Wilmer K. Wixson, of Germantown; Isaac M. Long, Philadelphia. Simon Friedburger is President.

Illinois Central.—The annual meeting was held in Chicago on Oct. 17. Oliver Harriman, John W. Doane and Charles M. Beach, whose terms as Directors expired, were re-elected to serve for four years.

Jamesstown & Lake Erie.—The property of the Chautauqua Lake Railroad has been transferred to this company, its legal successor. The recently elected officers are: President, Sherman Everts; Vice-President, J. F. Workum; Treasurer, W. M. Barnum; Secretary, Hamilton H. Durand; General Manager, W. E. Griggs. The general offices are at Jamestown, N. Y.

Kansas City, Fort Scott & Memphis.—J. M. Emmert, Assistant to the President has been appointed Superintendent of the Springfield Division to succeed H. W. Diggs, resigned.

Lexington & Eastern.—On Nov. 1 Receiver Hamilton F. Kean will surrender all control of the Kentucky Union road to the officers of the new organization, which will be known as the Lexington & Eastern. Under the articles of reorganization the directory will be composed as follows: Major H. C. McDowell, James D. Livingston, G. Copeland, Arthur Carey and Judge A. P. Humphrey. The Directors have elected the following officers: Major H. C. McDowell, President; James D. Livingston, Vice-President; George Copeland, Treasurer, and Arthur Carey, Secretary.

Louisville, Evansville & St. Louis.—The annual meeting of the stockholders was held at Belleville, Ill., last week, and the following directors elected: W. H. Tilford, B. Stillman, Charles Fairchild and W. H. Bull, of New York; Isaac H. Burr, of Boston; Thomas Barrett, of Memphis, Tenn., and Samuel Bogard, G. P. Hailman and E. O. Hopkins, of Evansville, Ind. The newly elected Board will meet in New York in about two weeks to elect officers.

Mexican Central.—Theodore R. Jones has been appointed Live Stock Manager.

Northern Pacific.—At the annual meeting of the stockholders the following Directors received all the votes cast, about 309,001 shares. The new board is composed as follows: August Belmont, Marcellus Hartley, J. Horace Harding, Brayton Ives, Donald Mackay, W. E. Sanders, John E. Seales, Winthrop Smith, H. L. Burnett, H. S. Redmond, E. C. Hegeler, William E. Rogers, and Charlemagne Tower, Jr. The five last-named were not members of the Board last year. General Burnett is said to be the representative of large blocks of both stock and bonds. Mr. Redmond is a member of the second mortgage bondholders' committee, Mr. Tower is a member of the third mortgage bondholders' committee, and Mr. Hegeler, who lives in La Salle, Ill., is a large holder of both stocks and bonds. William E. Rogers was for eight years one of the Railroad Commissioners of New York.

Northern Pacific.—The following changes in the Freight Department have been announced: S. G. Fulton, First Assistant General Freight Agent, Portland, Ore., in charge of traffic west of the Idaho-Washington State line, including Idaho points reached via the Spokane & Palouse branch, J. B. Baird, Second Assistant General Freight Agent, St. Paul, in charge of Asiatic traffic and such other duties as may be assigned to him as General Assistant. H. E. Still, Division Freight Agent, St. Paul, in charge of all local traffic east of the Missouri River, except on the lines in Manitoba. Robert Rantoul, Division Freight Agent, St. Paul, in charge of traffic in North Dakota (west of the Missouri River), Montana and Idaho, except points in Idaho reached via the Spokane & Palouse branch.

Alexander Tinling has been appointed General Agent at Tacoma, Wash., vice G. C. Chandler, deceased, and F. D. Gibbs, General Agent at Spokane, Wash., vice Alexander Tinling, transferred.

Seaboard Air Line.—The division superintendencies of the Seaboard Air Line have been abolished. T. W. Whisnant, who has been Division Superintendent at Portsmouth, Va., has been made Superintendent of Roadway for the entire system. S. G. Dickerson, who has been located at Abbeville, S. C., as Division Superintendent of Transportation, is made General Superintendent of the Transportation Department, and Carroll H. Smith, who has been the Western Agent at St. Louis, has been made General Agent, with office at Portsmouth, Va.

Southern Railway Co.—At a meeting of the Directors of the company in Richmond, Va., on Oct. 23, Directors were elected as follows: A. L. Boulware, of Richmond; Skipwith Wilmer, of Baltimore; Charles H. Coster, H. C. Fahnestock, Thomas F. Ryan, Samuel Spencer, Anthony J. Thomas, Samuel Thomas, and J. Hood Wright, of New York. Mr. Boulware is a prominent lawyer of

Richmond, being President of the Clearing House Association and of the First National Bank of that city. Mr. Wilmer is a well-known lawyer of Baltimore. Samuel Spencer was re-elected President by the new Board of Directors, as also were the other executive officers: Mr. Andrews, Second Vice-President, and Mr. Baldwin, Third Vice-President. No selection has yet been made for the office of First Vice-President.

H. J. O'Brien has been appointed Trainmaster of all trains between Alexandria, Va., and Danville, to succeed P. B. Peyton, who has been Acting Trainmaster.

Spokane Falls & Northern.—H. G. Stimmel has been appointed Joint Traveling Freight and Passenger Agent for this and the Nelson & Fort Shepard, and for the Northern Pacific for British Columbia. His headquarters are at Nelson, B. C.

St. Croix & Penobscot.—The new Board of Directors, elected at the recent annual meeting, comprises George P. Wescott and F. C. Richards, Portland; L. G. Downes and G. A. Lowell, Calais; and James Mitchell, Rockland. F. C. Richards, of Portland, formerly State Bank Examiner, was elected clerk.

Union Pacific.—Samuel A. Hutchinson, General Agent at Buffalo, N. Y., has been appointed General Traveling Passenger Agent.

Western Maryland.—The annual meeting was held in Baltimore, Md., on Oct. 17, and the following Directors were elected: B. A. Betts and William Kealhofer, Washington County; Edward Worthington, Robert Biggs and John M. Littig, Baltimore.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Akron, Bedford & Cleveland.—A company of this name has been incorporated in Ohio this week with a capital stock of \$300,000.

Altoona & Phillipsburg Connecting.—On Oct. 20 this new line was formally opened from Phillipsburg to Houtzdale, Pa., amid great enthusiasm. Meetings were held at Phillipsburg and Houtzdale addressed by President S. P. Langdon, Hon. S. J. M. McCarroll, President of the Clearfield, Conemaugh & Western, and others. A special train conveyed the officials and invited guests over the line. The line from Houtzdale to Ramey is practically completed, an overhead crossing remaining to be built over the Pennsylvania tracks at Ramey. This road is in direct competition with the Pennsylvania. Over 1,000,000 tons of coal are in sight for transportation, and the road is an assured success. The officers of the road are: President, S. P. Langdon; General Manager, W. Forsythe, and General Freight and Passenger Agent, George M. Cane.

Bangor & Aroostook.—Track laying on this road has reached Blaine, about 30 miles north of Houlton, Me. President Burleigh expects to have the rails laid to Presque Isle early in November and to Fort Fairfield and Caribou by the middle of December. The extension built this year will add 73 miles to the mileage of the road.

Blue Mountain.—The engineers have completed the survey on the branch road from Strausstown to Reading, Pa., and are now on the main line from Slatington to the Susquehanna River at Harrisburg.

Burrard Inlet & Fraser River Valley.—Percy Dickinson of Tacoma, one of the contractors for this road in Washington and British Columbia, and C. D. Rand appeared recently before a committee of the Vancouver Council appointed to investigate the cause of the delay in the construction of the railroad, which is to connect Vancouver with the Northern Pacific Railroad, and has been granted a provincial subsidy as well as a subsidy from the City of Vancouver.

Mr. Dickinson presented to the committee affidavits from himself and C. D. Rand, J. M. Ashton, H. S. Fuson of Tacoma, and others, substantiating the road's claim for an extension of time by reason of unavoidable obstruction to the progress of the work.

The delay largely grew out of the legal complication of the receiverships of the Northern Pacific and the Seattle, Lake Shore & Eastern. The City Council has not yet taken any action, affecting the subsidy. The company, under the terms of its subsidy, must complete the railroad to Vancouver by Dec. 31, 1895. A small force of men has been kept at work to hold the subsidy and right-of-way. The road is to be built from a connection with the Seattle, Lake Shore & Eastern Road into Vancouver, B. C.

Clearfield, Conemaugh & Western.—Hon. S. J. M. McCarroll, of Harrisburg, Pa., President of this new railroad, has been in New York this week on business connected with the awarding of a contract for the building of the first 33 miles of the line.

Chattanooga Southern.—It is stated that the contract for building the four mile extension from the main line to Round Mountain, Ala., has been let to Gordon Frank, of Jacksonville, Ala., who has commenced work with about 200 men. It is expected that the extension will be completed in 90 days.

Coast Railway of Nova Scotia.—Part of the right of way has been cleared as far as the fifteenth mile, at the lower end of Belleville, and grading is being actively carried on between Tusket and Belleville by a large force. Sorett & Co. have a large force of men getting out the stone for the Salmon River bridges which will be pushed to an early completion.

Columbus, Hocking Valley & Athens.—It was expected that the engineers making the surveys of the line between Columbus and Athens, O., would complete their work this week. But there can hardly be any construction work done till the injunction suits in court at Columbus have been disposed of. They are expected to come up for trial before the month ends.

Colorado Western.—This company was last week incorporated in Colorado to build lines from Grand Junction into the asphalt region of Utah. The capital stock is placed at 1,000,000 and the board of directors includes S. T. Vrain Lesiner, of Salt Lake, S. M. Logan, W. S. S. Bristol, S. G. McMullen and H. W. Ross, of Mesa County, Colorado. The company has been previously incorporated in Utah.

Cuyler & Woodburn.—A charter was issued by the Secretary of State at Augusta, Ga., on Oct. 16, to J. N. Wood, J. L. Hogan and others, of Bullock County, and J. L. Fleming and F. T. Lockhart, of Richmond County, incorporating this company, which proposes to build a short railroad out of Cuyler, Ga.

Duluth, Missabe & Northern.—There is some talk that this company will soon put a force of men to work constructing a line from Iron Junction to the new town of Eveleth, Minn., a distance of about ten miles. The Duluth & Iron Range has already built to that town.

East Stroudsburg & Matamoras.—A charter was granted at Harrisburg, on Oct. 23, to the East Stroudsburg & Matamoras Railroad, capital \$400,000, to build a

line 40 miles long through Monroe and Pike counties, Pennsylvania. Simon Friedberger, of Philadelphia, is President.

Eric & Central New York.—The projectors for this old scheme for a railroad between Cortland and Cincinnatus, N. Y., about 20 miles, Messrs. W. M. Meserole, N. H. Bundy and W. V. McCracken of New York City, have been in Cortland this week in connection with the proposed road, and their visit has given rise to many reports in regard to the possibility of the construction of the line being undertaken in a reasonable time.

Frederic & Charlevoix.—The track of the railroad has reached the town of Alba, Mich., 25 miles from Frederic on the Michigan Central. Connection is made at that place with the Grand Rapids & Indiana Railroad. The road is standard gage, laid with 60-lb. rails, has steel bridges, and is of first-class construction in every respect. The ballasting will not be completed until early next season. The grading is completed some ten miles west of Alba. The road is being built by David Ward, of Detroit, who owns pine and hardwood timber, which will be reached by the line.

Georgetown & Granger.—Grading was begun at Georgetown, Tex., on Oct. 16, on this railroad, a distance of 28 miles. It will give that town a competitive route via the Missouri, Kansas & Texas from Granger. A partly graded road bed will be utilized. The Railroad Commission has given permission to issue bonds, and it is hoped to have trains running by February.

Indiana, Illinois & Iowa.—It is announced that the extension of the road from Knox, Ind., to South Bend, Ind., 35 miles, will be opened for business Nov. 15. This connection will give the road direct access to all the Eastern lines over its own track.

Los Angeles, San Francisco & Salt Lake.—Articles of incorporation of the Company have been filed in California, the capital stock being \$12,000,000. The route is described in the charter as from Los Angeles, through Salt Lake, Utah, through the counties of Los Angeles, San Bernardino, Inyo, Kern, Tulare, Fresno, Merced, Stanislaus, San Mateo, San Joaquin, Santa Clara and Alameda.

Manchester & Rockville.—Surveys have been made for a new steam railroad from Burnside, Conn., to North Manchester, from thence to Rockville, Conn. It is expected that work will be commenced by Nov. 1. The route of this road will pass through beautiful valleys, near large lakes, and over the pine-clad hills.

Minneapolis & St. Louis.—It is announced that the branch of this road running from Red Wing to Mankato, Minn., is to be extended next year to a connection with the Wisconsin, Minnesota, & Pacific, known as the Pacific division. Arrangements have already been made for right of way through Mankato to the present Western terminus, and the extension will be about 40 miles in length. This extension has been talked of for a long time.

Montreal & Ottawa.—This road is now operated by the Canadian Pacific, from Vaudreuil, about 20 miles from Montreal, to Point Fortune, Quebec, something like 20 miles. Construction is done under a local charter, the Canadian Pacific carrying on the work under an agreement with the security holders. The company has received a large subsidy from the Ontario Government for the line already built, and for an extension beyond Point Fortune, through the County of Prescott, which, however, expires this fall. The local residents are disposed to insist that the company shall be compelled to build the extension this year or lose the subsidies, but Vice-President Shaughnessy has said that the large expenditures this year for the repairs caused by the floods in the Fraser River Valley and elsewhere, will prevent the company from beginning the work this year; but if the subsidy is extended he agrees to build the extension early in 1895. The matter is now before the Ontario Government for decision.

New Roads.—Harrison Kalbach and Sons, of Lebanon, Pa., have purchased 2,300 acres of timber, located 70 miles south of Clarksburg, W. Va., and to get the lumber to the line of the West Virginia & Pittsburgh road they are building a branch road six miles in length, of which four and a half miles have been completed.

Charles Hebard & Son, of Pequaming, Mich., are building a narrow gage railroad from Traverse Bay, on Lake Superior, to the copper range, to reach their extensive redstone quarry. The roadbed is nearly graded for seven miles. At Traverse Bay a dock 1,200 ft. long is being built.

Path Valley.—Work on this line, an extension of the Newport & Sherman's Valley, is still in progress on both sides of the mountain. On the Franklin County side all the heavy work has been completed and but little more grading is to be done. On the Perry County side the grading will be completed by the first of January. As soon as the bad weather of the winter commences work will begin in the tunnel.

Pennsylvania Midland.—Track laying on this new road, to extend through the counties of Bedford and Blair, with a branch into the Somerset County coal fields, was begun this week. Hon. George B. Orlady, of Huntingdon, Pa., is President, and E. A. Tennis, of Thompsontown, Pa., is the contractor.

Pittsburg & Lake Erie.—The directors have decided to build a branch line from the main track to the proposed new race course at Monaco, near Pittsburg, provided \$100,000 is subscribed to equip the racing track. Monaco is about fifteen miles from Pittsburg.

Quebec, Montmorency & Charlevoix.—The railroad has been extended from Ste. Anne, east to St. Joachim near Cape Tourment, Que.

Rumford Falls & Rangeley.—Work on this extension of the Portland & Rumford Falls road is being pushed. Eighteen miles have been subtlet by the contractors, Ward Brothers, of Kennebunk, Me. Two hundred Italians are at work and the number will be increased to 400. The contract is to be completed by Aug. 1, 1895, and it is predicted that at that time bids will be asked for 45 miles more of road to connect with the Canadian Pacific.

San Antonio & Gulf Shore.—President William Davis, of this company, has secured from the Railroad Commissioners of Texas, the Commission's authority to issue the company's 5 per cent. bonds to the amount of \$360,000. The Commissioners find that stock to the amount of \$285,000 has been subscribed and paid for, and that the company has complied with the State law regulating the issue of railroad bonds. The road is now being graded out of San Antonio, Tex. The rails have been purchased, and the Pittsburg Locomotive Works have built two locomotives for the road.

St. Croix & Penobscot.—A party of surveyors under T. R. Atkinson has started out to survey a route for this road from Princeton north to a point on the Maine Central near Danforth, Me., about 35 miles.

St. Joseph Valley.—About 100 men are now at work repairing this road. It extends from Buchanan to Berrien Springs, Mich., a distance of 16 miles and has been abandoned for about a year.

Toledo & Ohio Central.—The new terminals of this road at Columbus, O., were put into use this week. The road is meeting with much opposition in the construction of its bell line at Columbus, though some actual grading is being done on it. Citizens of the West Side are objecting to grade crossings, and are endeavoring to compel this road and the Columbus, Hocking Valley & Toledo Road to elevate their tracks about 13 ft., at a cost of about \$20,000. If they succeed in this, the Pennsylvania will be compelled to elevate also.

Tuscarora Valley.—The extension of this road to Blair's Mills, Huntingdon county, Pa., now seems an assured fact. Grading has commenced at several points along the line at Waterloo and other points. It is expected that the extension will be open for travel before January 1.

Washington & Chesapeake Beach.—An interest in this property is reported to have been acquired by J. E. Searles, the head of the syndicate which recently effected the consolidation of the Baltimore & Eastern Shore Railroad and several Chesapeake Bay Steamboat Companies. The road was planned to extend from Washington to Chesapeake Beach, on the Chesapeake Bay shore, in Calvert County Md. The company was organized September 1, 1891. It was intended to develop Chesapeake Beach as a resort for residents of Washington and Baltimore. The distance from Washington to the beach is over 30 miles.

The company started work about a year ago, and most of the road bed has been graded, but no rails have been laid. Mr. Searles' purpose in obtaining possession of the property and franchise is said to be to aid the development of Ocean City and to increase the traffic of the Eastern Shore Road. One of the projects, if the purchase is consummated, is to abandon that part of the road from Marlboro' to Chesapeake Beach. Instead of this the road may be run direct from Marlboro' through Anne Arundel County to Horseshoe Point, on the Chesapeake Bay, at the mouth of West River. From this point to Claiborne, the present bay terminus of the Eastern Shore Road, is almost a direct line. The distance from Washington to Horseshoe Point is about 28 miles.

Mexican Interoceanic.—A current newspaper statement has it that Delfin Sanchez, who is in London, has been successful in raising the necessary capital for the construction of the extension of the Interoceanic Railroad from Chietia, the present terminus, to the port of Acapulco, on the Pacific Coast. The contract for the work will be let upon the arrival of Mr. Sanchez in Mexico.

Wisconsin & Michigan.—The railroad which has been built by John Bagley, of Chicago, under this title in Wisconsin, was opened for freight traffic last week from a connection with the "Soo" Road on the north to Peshtigo. It secures a connection with the town of Marinette on the south over the Chicago, Milwaukee & St. Paul. The promoters of the new line are Chicago capitalists. The President is Samuel Fisher, of Chicago; General Manager, John Bagley, Marinette; Superintendent, J. E. Williams, Menominee. The completed work has cost, according to the General Manager's estimate, \$750,000. Next year the prospect is that the road will be extended to Norway and Iron Mountain, thus reaching the Menominee iron range. It is built to within 20 miles of Norway now. Another extension contemplated is over the route of the old projected Marinette & Western to Merrill, Wis. The road will be regularly opened for traffic by Nov. 1. Docks are to be built at Peshtigo.

Yankton, Norfolk & Southwestern.—W. W. Graham, a Chicago railroad contractor, has filed a suit in the United States Circuit Court for \$90,000 against the railroad company, the Traffic Construction Co., Atlantic Trust Co., and others. Graham had a contract with these companies to construct the bridges and culverts along the road from Yankton, S. D., to Norfolk, Neb.

GENERAL RAILROAD NEWS.

Baltimore & Ohio.—The Company has reduced the dividend to 2 per cent., for the six months from January 1 to July 1, 1894. The protracted strike of about six weeks on coal, and over two months on coke, resulted in heavy losses. The net earnings during the period named were, notwithstanding, sufficient for a dividend of 2 per cent., leaving a balance to the credit of profit and loss. The former rate was 5 per cent. The following table shows the earnings for September.

	1894.	Decrease.
Gross earn.....	\$2,45,000	\$275,000
Operating expenses.....	1,309,000	67,000
Net earn.....	736,000	208,000
For three months—		
Gross earn.....	\$5,192,162	\$406,606
Operating expenses.....	3,315,113	86,874
Net earn.....	\$1,877,049	\$319,732

The statement of earnings for the entire system for the quarter ending Sept. 30 shows a net decrease of \$435,555, as compared with the same period last year.

Central Pacific.—The English bondholders of the company at a recent meeting in London, formed a committee to represent their interests, and appointed Sir Charles R. Wilson, of London, their representative, to come to the United States and investigate the affairs of the company, particularly to recommend what action should be taken in regard to the first mortgage and the claim of the United States Government, a portion of which becomes due in 1895.

Choctaw, Oklahoma & Gulf.—A mortgage of \$1,000,000, in favor of the Finance Company of Pennsylvania, covering all the coal lands, leases, equipments and tracks of the road, has been filed in Oklahoma Territory. Work on the proposed extension of the line between Oklahoma City and South McAlester will begin immediately. The contracts for the grading are let.

Delaware River & Lancaster.—This road, which formerly was operated by the Philadelphia & Reading Railroad, and more recently by the Wilmington & Northern, has passed into the control of Major J. L. Butnam, of Saratoga, N. Y., who is its General Manager. J. C. Moore, of Hudson, N. Y., is General Traffic Manager. The office of the road is at St. Peter's, Chester County, Pa. Two trains each way are now run daily between Wilson and St. Peter's, connecting with trains on the Reading and Wilmington & Northern Railroads.

Denver, Leadville & Gunnison.—The South Park Railroad, in Colorado, now operated by a Receiver, will have its line to Gunnison re-opened in the spring. To open the Alpine Tunnel, now filled with ice, will re-

quire an outlay of fully \$100,000, yet Receiver Trumbull thinks it will pay.

Des Moines & Western.—The Metropolitan Trust Co., of New York, has begun a suit in the Federal Circuit Court at Des Moines, Ia., to secure the foreclosure of the mortgage bonds issued by the railroad. The bonds aggregated \$2,770,000, or \$18,000 a mile on each of the two branches known before consolidation as the Des Moines & Northern and the Des Moines & Northwestern. The present management will not resist the suit. After foreclosure, the interest of the bonds will be made four per cent. instead of five per cent. as at present.

Duluth & Winnipeg.—In the notice last week, announcing the appointment of W. F. Fitch, General Manager of the Duluth, South Shore & Atlantic as Receiver of this road, it was stated that the company operates 150 miles of road. The length of road now built is 120 miles northwest from Duluth, Minn., to Deer River. It was projected to be built to the international boundary, where it would connect with a Canadian road making a connection with the Canadian Pacific at or near Winnipeg.

Illinois Central.—The earnings for August are reported in the following table:

	1894.	1893.	Dec.
Gross earn.....	\$1,595,297	\$1,908,856	\$313,559
Oper. expenses.....	1,177,212	1,286,273	109,061
Net earn.....	\$418,085	\$822,583	\$204,498
For two months—			
Gross earn.....	\$2,807,415	\$3,698,592	\$891,177
Oper. expenses.....	2,163,431	2,544,605	381,174
Net earn.....	\$643,984	\$1,153,987	\$510,003

Northern Pacific.—At the annual meeting of the stockholders of the Northern Pacific Railroad Co., a statement of the Auditor to the Receivers was presented, covering the operations for the year ending June 30 last. During the first month and a half of this fiscal year the road was operated by the company, and thereafter by the Receivers, and the figures given include the operations of the Wisconsin Central lines and the Chicago & Northern Pacific Railroad from July 1 to Sept. 26, 1893, when they passed out of the hands of the Receivers of the Northern Pacific Co. Owing to these circumstances a comparison with the returns of the previous year is impracticable. The statement shows gross earnings of \$17,902,076, operating expenses and taxes, \$13,316,555; leaving net earnings from operation, \$4,585,521. Income from other sources is reported at \$826,513, making the total income \$5,412,034. The income from other sources includes \$157,500 in dividends upon St. Paul & Northern Pacific stock which was not received until after the close of the fiscal year, and also \$51,750, interest on Chicago & Northern Pacific first mortgage bonds, which is a bookkeeping asset, the bonds being in default. The charges against income are \$11,915,039, leaving a deficit of \$6,503,004. Of these charges \$1,680,373 is for rentals of track and equipment, and the greater part of the remainder is interest upon the various obligations of the company. The court has authorized the payment of the \$1,680,373 due for rental of tracks and equipment, \$3,286,010 of interest and sinking fund on the first mortgage, the interest on the Missouri and Pend d'Oreille division bonds, \$202,020; the interest on the collateral trust notes, \$529,280, and on the floating debt, \$314,346, and various smaller items, aggregating \$335,132. The total amount of payments authorized by the court is \$6,347,131.

Ohio Southern.—The recent action of the stockholders in regard to the acquisition of the partially graded Columbus, Lima & Milwaukee Road, is explained by an officer of the company, to provide for a lease of that line when it has been completed from Lima to Defiance, O. Lima is the present northern terminus of the Ohio Southern and the new road will give a connection with the Baltimore & Ohio, the Wabash, the Toledo, St. Louis & Kansas City, and the New York, Chicago & St. Louis Railroads, and entrance into Toledo and Detroit. With the extension to Cincinnati now under construction it will open up a through line between Cincinnati and Toledo. It will also afford an outlet for the product of its coal mines to the lake ports. About \$350,000 has already been expended on the extension, and the grading is nearly all done. The Ohio Southern does not issue any bonds or have anything to do with the work of construction, but takes the road over complete and in condition for operation, guaranteeing an interest not to exceed \$750 per mile.

Philadelphia & Reading.—George L. Crawford, Special Master in the Receivership, has filed with Judge Dallas, in the United States Circuit Court at Philadelphia, his report on the petition of the Receivers for authority to enter into an agreement for the partial readjustment of the affairs of the railroad and coal and iron companies. The Master recommends that the court make the following order: It is ordered that the Philadelphia & Reading Railroad Co. and the Receivers be authorized to enter into the agreements annexed to their petition filed Sept. 25, 1894, respecting the plan for the partial readjustment of the company's affairs, and in case the plan be carried into effect, to make the payments therein stipulated for.

Pittsburg, Akron & Western.—This railroad, constructed three years ago between Akron and Delphos, Ohio, 145 miles, was sold at Akron, O., on Oct. 17, on a mortgage of \$3,600,000 held by the Central Trust Co. of New York. The appraised value of the road was \$1,265,000. It was purchased by Fisher A. Baker, of Yonkers, N. Y., for \$844,000, who is attorney for the First National Bank of New York City, and represented New York and Pittsburg bondholders of the road.

Richmond, Petersburg & Carolina.—This railroad company has been organized, with a capital stock of \$500,000, to succeed the Virginia & Carolina Road. Bartlett Roper is President, D. B. Vaughn, Vice-President, and the following are the Directors: R. T. Arrington, Augustus Wright, E. A. Hartley, E. C. Venable, H. C. Roper, J. E. Maylor, John McGill and C. C. Alley. The railroad, which is an unfinished line, from Petersburg, Va., south to the State line, was recently purchased from the City of Petersburg, which held the controlling interest, by New York parties, who agreed to complete the road and operate it.

Union Pacific, Denver & Gulf.—The American Trust Co., of Boston, will begin suit in the United States Court at Denver for the foreclosure of the mortgage on the road. The company asks for the appointment of E. Ellery Anderson as co-Receiver with Mr. Trumbull. Mr. Anderson says he is in thorough accord with Mr. Trumbull, and the application for his appointment is owing to a desire on the part of large interests in the bonds to have adequate representation.

Wabash.—A syndicate headed by Messrs. Kuhn, Loeb & Co., of New York, has purchased from the Wabash Railroad Co. at 102 and interest, \$8,000,000 of its first mortgage five per cent. bonds. These bonds are issued to

take the place of a like amount of seven per cent. bonds maturing in 1895.

Western New York & Pennsylvania.—Secretary Strauss of the Reorganization Committee, reports that more than 97½ per cent. of the bonds of the company have assented to the plan of reconstruction, and about 92½ per cent. of the stock has paid the assessment.

York Southern.—This is the new title of the Baltimore & Lehigh, which was reorganized at York, Pa., Oct. 22. It was recently purchased by Warren F. Walworth at sheriff's sale. Warren F. Walworth was elected President; Charles C. Frick, Treasurer, and George W. Rupp, the present Treasurer, was elected Secretary. The Board of Directors of the new organization will be: W. F. Bay Stewart, E. J. D. Cross, M. H. Houseman, H. C. Niles, G. O. Wilson and S. M. Manifold, the present General Manager. It is the purpose of the new organization to make the road-gage, and a consolidation with the corporation operating the Maryland end, and an extension to the coal region of Pennsylvania are among the plans. An application will be made to the court soon to discharge the Receiver. The capital stock was fixed at \$600,000, and the bonds at \$150,000.

TRAFFIC.

Traffic Notes.

The Illinois Central has notified shippers at New Orleans that it will pay 20 cents per load of 1,500 lbs. for freight delivered at its freight house coming from places below St. Louis street. This allowance for cartage is understood to be made to meet the competition of the New Orleans & Northeastern which, having a station inconvenient to most shippers, has allowed this cartage ever since 1887.

F. & F. O. Squire, of East Cambridge, Mass., have sued the Boston & Albany for \$150,000 over charges on shipments of hogs from the West during the past six years. This appears to be the same suit which has been in the courts several times before. The papers in the present case fill 15,000 typewritten pages, there being 2,221 counts.

The Colorado Traffic Association, the organization formed in Denver a year or two ago to maintain a freight bureau to conduct the dealings of merchants with the railroads, is to be abandoned for lack of financial support. It is said that the principal shippers of the state have contributed to the support of the organization and that the bureau has secured many benefits in the way of reduced freight tariffs, but evidently they do not want too much of a good thing.

Chicago Traffic Matters.

CHICAGO, Oct. 24, 1894.

Eastbound all rail shipments last week showed a slight decrease from the preceding week. Westbound shipments are holding their own, but are not particularly encouraging.

Lake shipments from this port also largely decreased owing to a falling off in the movement of grain. Most of the vessels let out of the grain trade, however, got iron ore contracts. It is expected that the iron ore and coal trade will hold up until the close of navigation.

Lake rates were fairly well maintained and there was probably less than the usual amount of manipulation of all-rail rates. With the light tonnage, however, there is little likelihood that eastbound rates will be very well maintained until the lower Mississippi crossings are brought into an agreement for a division of tonnage similar to the Chicago agreement.

Members of the Advisory Committee of the Western Passenger Association have been successful in reaching an amicable agreement with the trunk lines, by which the operation of the immigrant clearing house at New York is to be continued, for the present at least, in the hands of the joint agent of the Western roads. No settlement has yet been reached with the Canadian Pacific. That road still insists upon a recognition of its differentials on Pacific Coast business as a condition precedent to its becoming a member of the clearing house. This question is being further considered by the Western lines this week.

The Eastern lines seem unwilling to join the Western lines in a "wide-open" agreement to meet the passenger rate competition of the Soo Line, but intimate that they will support the Western roads in meeting the Soo Line's rates through Chicago on all business in direct competition with the Soo and Canadian Pacific via Montreal to the seaboard.

Testimony was taken here last week on behalf of the Cincinnati and Chicago Freight Bureaus in their suits against the Southern roads, seeking to secure the enforcement of the order of the Interstate Commerce Commission for a reduction in rates. Testimony was heard from H. E. Felton, General Freight Agent of the Chicago & Eastern Illinois, Henry N. Mann, shipper of wooden ware, Freight Manager Bell, of the Crane Co.; Wilson Brothers, and Commissioner Igglehart, of the Chicago Freight Bureau.

The shipments of east bound freight, not including live stock, from Chicago, by all the lines for the week ending Oct. 20, amounted to 46,594 tons, against 47,068 tons during the preceding week, a decrease of 794 tons, and against 63,234 tons for the corresponding week last year. The proportions carried by each road were:

ROADS.	WEEK TO OCT. 20.		WEEK TO OCT. 13.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central.....	2,516	5.4	2,665	5.7
Wabash.....	6,514	14.0	5,880	12.5
Lake Shore & Mich. South.....	4,057	8.7	4,994	10.6
Pitts., Ft. Wayne & Chicago.....	5,165	11.1	4,370	9.3
Pitts., Cin., Chi. & St. Louis.....	8,178	17.5	7,620	16.2
Baltimore & Ohio.....	4,194	8.9	3,900	8.3
Chicago & Grand Trunk.....	3,446	7.4	3,545	7.5
New York, Chic. & St. Louis.....	6,236	13.4	5,642	12.0
Chicago & Erie.....	5,426	11.6	4,918	10.4
C., C. & St. Louis.....	862	1.2	3,534	7.5
Totals.....	46,594	100.0	47,068	100.0

Of the above shipments, 1,967 tons were flour, 13,392 tons grain and mill stuff, 8,145 tons cured meats, 13,580 tons dressed beef, 1,390 tons butter, 1,837 tons hides, and 4,194 tons lumber. The three Vanderbilt lines carried 27.5 per cent., the two Pennsylvania lines 28.6 per cent., Lake lines carried 49,900 tons, against 150,856 tons last week.